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GEOGRAPHIC INFLUENCES AFFECTING THE EARLY DEVELOPMENT OF AMERICAN COMMERCE.

BY

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The development of the commerce of every country is the resultant of many forces. Social ideals, individual traits and aptitudes, the status of political organization, the legislative policies followed—each of these has had its influence; but they are neither the primary nor the most potent determinants of the nature and scope of a nation's commerce. Economic conditions are the cause of trade and they most strongly control its growth.

Social ideals may strengthen the impulse of the individual to trade and cause him to develop mercantile and maritime traits. The history of New England for more than two centuries affords striking confirmation of this truth. The aspiration of a country to become an impregnable naval power will impel the government to give large aid to trade and shipping—a fact amply verified by the history of Japan since 1895, of Germany since 1870, and of England and Great Britain since 1650.

When social ideals, individual aptitudes and economic conditions harmonize, and are favorable to international commerce, and to the building and operation of ships, as they are to-day, to a marked degree, in Great Britain and Germany, and in a large measure, in Japan, legislation for the promotion of commerce and shipping may be an effective auxiliary; but when these fundamental prerequisites are wanting, as they are in great part in France, laws can accomplish but little. During the latter half of the nineteenth century the social and economic forces controlling the investment of capital and the expansion of industry in the United States brought about a large foreign trade; but ships could not be built profitably for sale

abroad or for operation in competition with the vessels under the flags of other countries. There has been some change in the situation since 1900, and the time may be near, if indeed it be not now at hand, when the American marine can be aided by legislation.

Analysis of the Forces Controlling Economic Progress.—The economic forces that control the development of industry and commerce are in part natural, or geographic, and, in part, artificial, or of man's creation. The earth, as the field of human endeavour, broadly controls what man may do; it may bestow free gifts upon mankind; it may, and more often does, place obstacles, more or less difficult to surmount or circumvent, between man and the goal of his efforts; or it may fix definite limits beyond which it is vain to attempt to pass.

In the early life of the human race geographic control was absolute; with the progress of mankind, the dominance of mind over matter, of man over his physical surroundings, has increased with accelerating speed; so that to-day men are able to live and prosper in regions formerly uninhabitable, and are able to live with far greater comfort than was formerly obtainable. Mechanical power has made numerous forces of nature minister to the wants of man, and has enabled him to free himself from many of the restraints of the world in which he lives.

Man's triumph over nature is, however, not complete; and, if it were, the forces of nature and the earth's material resources would still largely control his life; because he can live only by co-operating with nature. Temperature, winds, ocean currents, soil fertility, mines, forests, land and sea life—these still regulate his economic life and largely mould his character.

At the time of the settlement of America, three centuries ago, industry and commerce were aided but slightly by the mechanical agencies which now enable men to modify, direct, and turn to the service of mankind the forces exerted by his physical environment. Geographic conditions exercised such a strong influence upon the economic development of America that the history of American commerce should begin with a survey of the geography of the North Atlantic and the eastern part of North America. In making this survey, it will be best to consider the geographic control of both industry and commerce. As commerce is carried on chiefly to aid industry, both must receive attention in this analysis, although the presentation will as far as possible be made with reference to commerce.

The subject naturally divides itself into two parts: one covering

the period of the seventeenth and the larger portion of the eighteenth century, during which time the region between the Atlantic coast and the Allegheny Mountains was being settled and developed; the other part including the period of the occupation of the great country beyond the Appalachians—the Mississippi Valley and the West. The first period coincides roughly with the colonial epoch, the second with the national era. The mountains had been crossed and settlements had been made in the Ohio Valley, before the Revolution—especially after the French and Indian War—but the real work of occupying the vast trans-Allegheny country was undertaken after the War of Independence. This paper has reference to the period prior to 1789, and is limited to a discussion of the geographic factors influencing the industrial life and the over-sea and intercolonial commerce of the section east of the Alleghenies.

The geographic factors of control were maritime and terrestrial. The settlement and subsequent development of America were largely influenced by the shape of the North Atlantic, its winds, its currents, and its fisheries. The spread of population along the coast and toward the interior, the industries established in each colony, and their growth or decline, the over-sea and domestic exchange of products—these were largely determined by land factors, by the terrene of the Atlantic slope.

The maritime factors may be considered first. The narrowness of the North Atlantic and the eastward reach of the Grand Banks off Newfoundland made possible the regular pursuit of the fisheries in American waters by English, Dutch, Portuguese, and French during and after the early years of the sixteenth century. Fishing in America antedated permanent colonization by a full hundred years.

The Continental Shelf and the Fisheries.—The Atlantic continental shelf of North America, or that part of the uplifted continent that is covered by the sea, slopes gently from the shore seaward approximately to the line of 100 fathoms of ocean depth. From this line the descent is rapid to the abysmal area of the main floor of the Atlantic. On the southeastern edge of Florida, the line of 100 fathoms' depth runs close to the shore, there being a moderate depression between Florida and the submarine plateau upon which the Bahama Islands are built. Northward from Florida the continental shelf gradually widens with the exception of a slight narrowing of the shelf by the eastward projection of the North Carolina shore above and below Hatteras—the width off Georgia and South Carolina averaging about 100 miles. From New Jersey eastward and northward the shelf rapidly broadens until it reaches its

maximum breadth of about four hundred miles in the banks off Newfoundland, the only areas upon the broad shelf where the ocean is more than 100 fathoms deep being the central part of the broad bay between Cape Cod and Nova Scotia, the entrance to the Gulf of St. Lawrence between Cape Breton Island and Newfoundland, and limited portions of the Gulf itself.

The wealth of fish off the Atlantic coast of America from Long Island to the Grand Banks is the result of two causes: The broad "continental shelf" widening from south of the Nantucket shoals northward and eastward to the Grand Banks gives a large area of shallow ocean and provides a spacious home for the cod, mackerel and other fish of commerce. This home is rendered the more habitable and more populous—especially for the cod—by the cool water brought down from Arctic latitudes by the Labrador Current that flows past Labrador, through the Gulf of St. Lawrence, about Newfoundland, over the Grand Banks, and along Nova Scotia and the New England coast until it is overcome by its opponent, the more powerful north-flowing Gulf Stream.

The oyster and shad fisheries of the Middle Atlantic seaboard are of much economic value, and there are sea fisheries of importance along the South Atlantic and Gulf States of the United States. The oyster fisheries of Maryland are now of great value; but during Colonial times the seafood products secured along the coasts of the Middle and South Atlantic colonies held a minor rank in comparison with the wealth of fish caught in the cooler waters of the broad northern continental shelf, extending seaward from New England and Canada. When one considers the limited possibilities of agriculture in New England and the wealth of life in the ocean that washes her shores, it is easy to understand why the fisheries and the trade in fish were the most important factor in the economic development of New England throughout the Colonial period.

Shore Line and Harbours.—The succession of deep bays and prominent headlands along the Atlantic coast north of New Jersey forms a shore line contrasting strikingly with the generally unbroken littoral of New Jersey and of the States to the south of Virginia. From the mouth of the Hudson eastward and to the north the sea has invaded the land, submerged a former coastal plain, and made it a part of the widened continental shelf. The only parts of the former coastal plain now rising above the sea are Long Island, Nantucket, Martha's Vineyard, and the small islands in the vicinity. Indeed, the subsidence of the land northward from Cape Cod was so great as to submerge a large part of the piedmont belt of archæan

rocks adjacent to which the coastal plain had been laid down in a geologically recent period. Although a subsequent slight uplift has reclaimed from the sea a fringe of land along parts of the coast, the net subsidence is such that the rugged coast of New England north of Cape Cod, of New Brunswick, Nova Scotia, and the islands beyond is broken into bays and fiords separated by bold peninsulas and guarded by outlying islands of granitic rock. At some places, as at Mount Desert Island, the mountains rise from the sea; elsewhere the low hills of the piedmont give character to the shore formation.

From New York toward the south the coast has sunk but little, and the coastal plain, widening southward, intervenes between the sea and the belt of rolling hills forming the piedmont, or Allegheny foothills. Between what are now New Jersey and North Carolina the subsidence was enough greater than it was immediately to the north and south to form the shallow estuaries of the Delaware and Chesapeake. The drowning of the lower valleys of the Delaware and the rivers flowing into the Chesapeake provided numerous navigable waterways across the coastal plain, and gave ample harbours to a large section of country. The beds of these bays are the favourable habitat of the shellfish, the trade in which is of great value.

The influence of the continental shelf and the Atlantic shore line upon the industrial and commercial development of the American colonies is easily discernible. They account for New England's long-continued leadership in the fisheries; and they, together with the land factors to be discussed presently, go far to account for the greater attention given by those colonies to shipping and commerce than was given to maritime pursuits by the Middle and Southern colonies.

Before pointing out in detail the economic results of geographic control, it will be best to consider the more important land influences upon the life and growth of the colonies. The lines of progress taken by the several colonies were determined by land and ocean influences more or less minimized or accentuated by the differences in the social forces dominant in the northern, middle and southern sections of the country.

The Rivers, the Fur Trade, and Water Power.—The streams afforded or denied access to the unsettled and unexplored land, and were the natural highways through the country after settlements had been established; they decided the rapidity or slowness of occupation; they located and conditioned the growth of the towns as centres of inland trade and as ports of maritime commerce.

The vain search made by the English, Dutch and French navigators for the Northwest passage around America to the Orient led to the exploration of practically all the large streams from the James to the St. Lawrence. Close after the explorers came the more successful fur-traders, who secured from the savages the second contribution made by America to the wealth of Europe—the gold of the West Indies and the Spanish-American mainland having been the first gift of the New World to the Old.

The Hudson River became the chief centre of the early fur trade. The noble stream provided a broad highway one hundred and fifty miles inland, and the Mohawk brought the tidal Hudson into easy communication with a large interior section, inhabited by exceptionally thrifty and energetic tribes of Indians. For fifty years the fur trade of the Hudson Valley, and to some extent of the surrounding country, was conducted by the Dutch who placed this trade, at least during the first half of their occupation of the country, ahead even of agriculture.

While the fur trade of the Hudson exceeded that of other rivers, the difference was mainly in degree. The Connecticut and the lesser streams of New England, the Delaware, Lehigh, Schuylkill, Susquehanna, Potomac, James, and the many tributaries of the Chesapeake floated the peltry-laden Indian canoes down to the interior and coastwise posts of the traders.

The people of New England did not give so much attention to the fur trade as did the Dutch to the West and South, or as did the French on the North. In the earlier years of their colonial life the Dutch and French could make the purchase and sale of peltries their chief business, because the Hudson and St. Lawrence made that possible. In New England, on the contrary, the rivers, with the exception of the Connecticut, were short and were rendered unnavigable, almost from their mouths up, by numerous rapids and falls. In this regard, however, New England's limitation was her good fortune. The profits derivable from the fisheries, agriculture, and commerce, and the social benefits resulting from their pursuit, so far exceed those of fur trading that the economic and social progress of a colony is hindered rather than aided by giving much of its energy and capital to trading in furs.

The fact that most of the streams of New England were small and had rapids or falls near the sea had several consequences. The settlements and towns were located near the ocean, and the early life of New England was carried on largely within sight and sound of the sea. As the settlers advanced inland and occupied the coun-

try for agriculture, they found the soils, which throughout New England were the result of glaciation, to be stony or sandy in many sections and fertile in only limited areas. The gains to be made from farming, while sufficient to cause New England to have a steady development in agriculture, did not so lure men away from the sea as to check the steady and rapid growth of fishing, shipbuilding, and trading. Before the Colonial period came to an end the unrivalled water-power afforded by the New England rivers began to be used to a small extent for industrial purposes. Later, in the early decades of the eighteenth century, when capital had become more abundant and machinery had been improved, this water-power made New England the manufacturing centre of the United States, and gave character to her entire industrial development.

Glaciation and its Consequences.—The glacial deposits covering New England, New York and northern New Jersey and Pennsylvania determined their soils and largely conditioned their economic activities. In New England the deep covering of glacial material made the country yield moderate or meager returns to agriculture, except in the limited areas of alluvial soil, but to compensate for this parsimony nature was bounteous in her gift of grand forests and of ample water-power. Glaciation remodeled the drainage system, constructed numerous lake reservoirs in the river valleys, forced the streams into new channels, and sent their waters hurrying over rapids and tumbling down cataracts. The till and sand formed a thick sponge that absorbed the water falling in the copious rains and abundant snows, distributed it by filtration slowly to the streams, and gave the rivers a nearly even flow throughout the year. Thus the forests and natural harbours of New England favoured shipbuilding and commerce, while the free gift of water-power, abundant, widely distributed, and reliable, predestined her to an industrial career.

The results of glaciation were different in New York, northern New Jersey and Pennsylvania from what they were in New England. The *débris* left by the ice cap as it receded from New England consisted of materials worked up from rocks that made less generally fertile soils than were manufactured from the rocks which were supplied to the ice mill by the section to the west and south of the Green Mountains and the Berkshires. This is especially true of New York State, the river valleys and wide interior of which rank high in agriculture. Northern New Jersey and northeastern Pennsylvania are less fertile. The water power resulting from glacia-

tion west of New England was less per unit of area, and was, in most cases, located so far inland from the sea as not to be economically available at an early date.

The Coastal Plain and Fall Line.—South from the valley of the Hudson the section of country between the ocean and the Allegheny front is separable into three well-marked divisions. Along the Atlantic lies the coastal plain made up of sandy or gravelly soils interspersed with areas of clay and of alluvium. This plain, narrow at the north but widening southward to a breadth of 200 miles —the remnant of one that formerly extended from the Grand Banks to the Gulf of Mexico—was laid down in the geological yesterday under the margin of the sea when the ocean reached inland to the old archæan uplift now represented by the rolling uplands of the piedmont. The submarine plain thus constructed of the materials eroded from the archæan highland was subsequently raised above the level of the sea. A recent subsidence of the coast has restored to the sea a portion of the land in the neighbourhood of the Chesapeake and the lower Delaware and has enabled the ocean to regain more ground than it had lost north of Long Island; but most of the southern half of the plain remains dry land. The sands, gravels and clays of the geologically youthful coastal belt rest upon the lower-lying old rocks of archæan antiquity, and the west-northwest, or inland, margin of the recently-made plain borders directly upon the ancient piedmont.

The union of these two belts—the coastal plain and the piedmont—is clearly marked by the "fall line." As the rivers that flow across the piedmont pass from the resistent archæan rocks to the easily eroded strata of the coastal plain, rapids and falls of moderate descent are formed. The ocean tides invade each river to the fall line, and make most of the streams readily navigable for the ocean-going ships employed prior to the use of the large modern steamers. The natural and favourable location for a seaport and for a manufacturing city being at or near the head of river navigation for ocean vessels—at the point where there is power for industry and a free highway for commerce—, the fall line from New York south may be traced on the map by a line passing through Trenton on the Delaware, Philadelphia between the Schuylkill and the Delaware, Baltimore on an arm of the Chesapeake, Washington on the Potomac, and Richmond on the James. Further south the fall line passes close to Raleigh, near the Neuse, Columbia on the Congaree, and Augusta on the Savannah. Raleigh is not a river city. Columbia and Augusta are at the head of steamboat navigation, but are situ-

ated too far inland on relatively small streams to have ever been the head of ocean commerce. The earlier and later cities of first importance in the Carolinas and Georgia, where the coastal plain is widest, were located near the sea, *e. g.*, Wilmington, Charleston and Savannah.

The cities along the fall line from New Jersey to Virginia early became the commercial centres both of the coastal plain, where the earliest settlements and plantations were established, and of the piedmont into which population easily spread by way of the many river valleys. North of Virginia the piedmont, being narrow, readily accessible, and fertile, was settled earlier than it was in and south of Virginia, although the Virginia plantations had overpassed the coastal plain long before the Revolutionary War.

To the north and east of the Chesapeake, where small-farm agriculture prevailed, the increase and spread of population caused cities to grow up as centres of trade and industry; but in the section of the country where the land was held in plantations, trade did not centre in cities, but was segregated among the plantations and small towns. Baltimore, near the head of the Chesapeake, grew not only because it was the market for Maryland, but also as a result of being an important emporium for the trade up and down the Susquehanna Valley. Even so, it did not rival Philadelphia in rate of growth during the eighteenth century.

In structure and fertility, the sandy, light soils, the alluvial river plains, and the salt and fresh water marshes of the coastal belt were in sharp contrast with the soils formed from the piedmont gneiss which disintegrated into the heavy clays, such as are found in parts of Virginia, and into the lighter micaceous and sandy clays prevalent in southeastern Pennsylvania. In general, the lands of the coastal plain, with the exception of the limited areas of alluvium, were less fertile and more easily exhausted than were those of the piedmont; but the soils near the sea had the merit of being easily brought into cultivation during those early years of settlement, when the colonists were gaining a sure footing on the edge of the great New World wilderness.

The first permanent colony in America was planted on the river bottoms and the sandy uplands along the coast and between the rivers of "tidewater" Virginia. Soon thereafter the lands about the Chesapeake in Maryland were settled. On these lands the culture of tobacco in Virginia and of tobacco and cereals in Maryland was easy and profitable; and, although the light soils could not endure the improvidence of plantation farming, there was, at least for

many decades, an abundance of virgin land within the wide plantations or on the frontier to be substituted for the worn-out fields.

The early settlers on both banks of the lower Delaware found fertile soils in the alluvium and marl belts along the estuary and tidal river; and prosperous farming antedated Penn's arrival by more than forty years.

In the Carolinas and Georgia settlement began along the shores of the broad Albemarle and Pamlico Sounds—then readily entered and traversed by ocean vessels—and at the junction of the rivers with the bays by which the sea indents the coast at numerous places from Cape Fear southward. On the low coast lands rice and indigo were the crops most grown, while from the adjacent sandy uplands the pine forests provided unlimited quantities of naval stores.

The main products grown or secured from the coastal plain from Delaware Bay to Florida—tobacco, rice, indigo, naval stores—were export commodities. There could be but small market for them in America; if sold at all they must be sent across the sea; hence it was that the Southern colonies had a larger commerce with Europe than did the Middle and New England colonies, despite the fact that the people of the northern settlements had a more diversified industrial life and engaged far more actively in maritime pursuits.

The Piedmont.—The piedmont extends inland from the ocean to the mountains in New England, and from the fall line to the first distinct mountain ridge. This ridge includes the highlands through which the Hudson has cut its scenic course, the highlands of New Jersey, the range of hills from the Delaware below Easton to Reading on the Schuylkill, the northern half of South Mountain running southwest from Reading toward the Susquehanna Valley, South Mountain extending from the Susquehanna to the Potomac at Harper's Ferry, and the Blue Ridge, which from the Potomac south presents an unbroken range of mountains that grow higher and broader until their climax is reached in the lofty summits and massive ranges of the Carolinas.

From the Hudson to the Potomac the piedmont belt is narrow, and is made up of a rolling country of high average fertility, seldom reaching five hundred feet above sea level. The productive farming and dairying counties of southeastern Pennsylvania—with the exception of those in the Appalachian Valley to be described presently—lie within the piedmont. From the Potomac River to northern Georgia the piedmont is a broad upland country, much of which is between 500 and 1,000 feet above the sea. This wide belt of

well-timbered "foot hills" was but gradually settled and not fully occupied during the Colonial period; indeed, many of the central sections of Virginia and the Carolinas are somewhat sparsely settled even to-day. Its soils average well, though not high, in fertility, but when well tilled they yield good returns. During the first half of the seventeenth century this region furnished furs for export; thereafter lumber and naval stores became most important, while plantations and farms advanced slowly up the river valleys and back from them onto the intervening divides. The first great development of the piedmont in the Carolinas and Georgia came toward the end of the eighteenth century, when cotton became a profitable crop.

The Appalachian or Great Valley.—West of the Blue Ridge and its northern extensions, and intervening between that range of mountains and the eastern front of the broad Allegheny plateau, lies the Appalachian or "Great" Valley. This remarkable valley extends, with nearly unbroken continuity, from the Gulf of St. Lawrence almost to the Gulf of Mexico. From north to south this intermontane depression includes in turn the lower basin of the St. Lawrence River and Lake St. Peter, the trough containing the Richelieu River, Lake Champlain and the Hudson River, the "Kittatinny" Valley across northern New Jersey, the Allentown-Lebanon-Cumberland Valley stretching across Pennsylvania and Maryland to the Potomac, the Shenandoah Valley of Virginia, the somewhat disconnected but physiographically related mountain valleys occupied by the headwaters of the Kanawha, New and Tennessee rivers, and lastly, the valley of the Coosa River, which sends its waters by way of the Alabama River to Mobile Bay.

The Appalachian Valley is noted for its exceptional fertility. North of New Jersey glaciation has limited its productive powers, but south of New Jersey the soils of much of the valley are formed of distintegrated limestone. "There is, perhaps, no other area in the United States where as wide a range of field and garden crops will flourish with the same luxuriance as here." * Lying at an elevation of 500 to 2,000 feet above the sea (except in the highest mountains of North Carolina and Tennessee), and having everywhere abundant rainfall and a most favourable climate, with summers that are not enervating and winters that are only moderately cold everywhere, except in northern New York and in Canada, this valley along the eastern edge of the Adirondack, Catskill, and Allegheny mountains early invited settlement. Indeed, within fifty

* Professor N. S. Shaler. "The United States." I, p. 72.

years after the founding of Philadelphia scores of towns had been started in the Lebanon-Cumberland valleys, and the occupation of the beautiful Shenandoah Valley had been begun by emigrants from tidewater Virginia, and by the Scotch-Irish who came south from Pennsylvania. During the first two-thirds of the eighteenth century the Appalachian Valley, and the many lesser valleys opening out from it, constituted the western frontier, towards which emigration was steadily directed.

This fertile valley, lying relatively near the sea and readily accessible, was an influential factor in the economic progress of the colonies during the fifty years preceding the Revolution. While the expenses of transportation by the ways and vehicles then available prevented the valley from exporting much of its food products oversea, its agricultural surplus enabled the farming sections of the country nearer the seaports to ship more than they otherwise could of their grain and provisions to the West Indies and Europe. Moreover, when the long war with Great Britain cut off the maritime commerce of America for seven years and threw heavy financial burdens upon the people of the new commonwealth, they were strengthened economically by the wealth annually created in the Appalachian Valley, the agricultural West of that day.

The Rivers as Highways of Inland Commerce.—The commercial highways of the colonies were the ocean and the rivers. Settlement —as was stated above—starting along the bays and at the head of tidewater navigation advanced inland along the streams and spread thence laterally over the country by way of the tributaries of the rivers. Most of the intercolonial intercourse was coastwise by the sea and on such long arms of the ocean as the Delaware and Chesapeake Bays; although the rivers—the Merrimac, Connecticut, Delaware, Susquehanna, Potomac, and Savannah—were also used to a minor extent in intercolonial traffic.

Practically the only avenues of inland commerce were the rivers, which until some time after the beginning of the national period remained unimproved. The rivers, however, were far more serviceable to commerce in the seventeenth and eighteenth centuries than they are to-day; not only because traffic was then of small volume and was handled in small units, but from the fact that the rivers then drained well-forested catchment basins from which the runoff of water into the streams was less rapid in times of heavy rainfall, and was more evenly distributed through the year, than is the case at the present time, when the forest areas have been greatly restricted or totally destroyed by axe, fire, and plow.

The crudely constructed boats brought the productions of the up-country settlements down the Connecticut, Hudson, Delaware, and other rivers cheaply and without great difficulty, during most seasons of the year except in the winter, to supply the markets of the seaports, and load the vessels outbound for the West Indies or Europe. The movement of traffic up-stream was more expensive, but its volume was light as compared with shipments made with the current. As long as settlement was confined mainly to the river valleys, the transportation facilities afforded by the streams enabled the colonies to make steady, though moderate, progress. When the country east of the Allegheny Mountains came to be generally occupied—as it did toward the end of the eighteenth century—turnpike roads were constructed to facilitate long-distance traffic and the agitation for river improvement and canal construction gathered headway.

The Allegheny Passes and the Beginnings of Western Commerce.—Even before the Revolution the colonies south of New York began to push across the mountains and to plant outposts along the upper waters of the Ohio and Tennessee rivers. The main gateways of the Alleghenies were reached by ascending the rivers. The broad plateau from which the Allegheny Mountains rise slopes to the southeast as far south as the valley of the New River, and consequently the Susquehanna, Potomac, and James rivers cut their way across the ranges and reach the piedmont through deep gaps. The southern half of the Appalachian highland slopes to the west and south, and the New, Holston and other rivers by which it is drained rise near the Blue Ridge, on the eastern margin of the plateau.

The approach from Pennsylvania was up from the Susquehanna by way of its West Branch and the Juniata and its southern affluents, and thence across to the streams flowing into the Allegheny River. From Maryland and Virginia the route west was up the Potomac either to Cumberland and over the gap to the Youghiogheny River, or up to the mouth of the Shenandoah and by that stream to its head and on into the valley of the upper James, where a route might be taken westward up the James and across to the Greenbrier and thence to the Kanawha, or a trail might be taken to and up the New River to the divide leading to the headwaters of the Holston, which was sometimes followed to its union with the Tennessee, but more frequently was left just north of the boundary of North Carolina, where passes were crossed into the valleys of the Clinch and other streams, from which the trail led through the

Cumberland Gap to the headwaters of the Cumberland River. Another route west frequently taken by the tidewater Virginians was up the James and thence either by the Greenbrier River or by the Cumberland Gap. The people of Carolina had only to cross the Blue Ridge from the Yadkin and other streams to reach the New River or the streams flowing into the Holston.

The natural approaches to the West from the Atlantic seaboard lay to the north and south of the Allegheny Mountains through New York and northern Georgia; but the Hudson-Mohawk route ran through the territory of the powerful Iroquois who co-operated with the French in retarding the westward progress of the English; while at the southern end of the mountains were the Creeks and Cherokees whom the Spaniards inspired to oppose the English. It was not until some time after the establishment of the National Government that these easier highways to the West could be safely taken.

The advance of population across the Alleghenies by these routes was the first of the great westward movements by which the American continent has been occupied from ocean to ocean. The settlements made after the close of the French and Indian War in western Pennsylvania, and in what is now Ohio, Kentucky and Tennessee, could have no trade with the people on the Atlantic slope, because the mountains were an impassable barrier to transportation. The first commerce of the trans-Allegheny sections was carried on through New Orleans, with which they were connected by river ways. This river trade, however, did not antedate the Revolution. Regular commercial intercourse between the sections east and west of the Alleghenies began during the last decade of the eighteenth century; and it was not until the second and third decades of the nineteenth century that the transportation facilities were such as to permit much traffic to be carried across the Alleghenies.

It may be stated, in generalization, that throughout the Colonial period, American commerce, with the exception of the fur trade, was restricted by geographic conditions to the domestic and oversea trade of the section lying between the Alleghenies and the ocean; that the shipment of goods from the western slopes of the Alleghenies to the mouth of the Mississippi began after the Revolution; and that the traffic east and west across the Alleghenies did not become of much importance before the beginning of the nineteenth century.

General Results of Geographic Control.—This brief survey of

the geographic conditions obtaining on the Atlantic slope of America from Newfoundland to Florida suffices to show that the productions and the consequent trade of the three large sections—the New England, the Middle and the Southern Colonies—were subject to dissimilar geographic controls.

By devoting themselves to fishing, shipbuilding, navigation, and to raising the cereals of the northern temperate latitudes, the settlers of New England tended to compete with the people of England. The consequences of this were that the British markets for the exports of New England were restricted both by the economic activities of the English people and—with the exception of the building and operation of ships—also by the navigation and trade laws enacted by England to protect and develop her industries. Their geographic environment predestined the New England colonists to trade, and being unable to exchange their commodities under favourable conditions in England for the British manufactures they required, the people of New England built up a large export trade to the West Indies and thereby secured the goods and coin with which to purchase English wares.

The colonies of New York, New Jersey, Pennsylvania and Delaware which were rich in agricultural and forest resources, and had some mineral wealth, also found profit in engaging in the West Indian trade. These colonies could trade with the home country more easily than New England could; but their imports from England greatly exceeded their exportations to that country. Until after the close of the eighteenth century Great Britain's imports from America were mainly of the commodities she did not produce at home, hence it was that the tobacco of Maryland and Virginia, and the naval stores, rice, and indigo of the Carolinas and Georgia constituted the larger share of the colonial exports to Great Britain.

The effect of the geographic forces that caused England to import a comparatively small amount of the products of New England and the Middle Colonies and to buy large quantities of the natural exports of Maryland and the more southern colonies was enhanced by the corn laws and trade legislation enacted by England and Great Britain during the seventeenth century. A knowledge of American geography aids not only in understanding the development of American commerce during the Colonial period, but also reveals some of the reasons why England legislated as she did in regulating the industries and trade of her American colonies.

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THE HIGH AND LOW STAGES OF THE MISSISSIPPI RIVER DURING THE YEAR 1906-7.*

BY

ROBERT M. BROWN.

The stages of the Mississippi River during any year are, in general terms, a falling stage which extends from about June 1 to the end of the year and a rising or flood stage which controls the river during the early months of the year. During the low stages, the work of the engineers is centered on a navigable channel, while protection to the inhabitants of the basin and their properties is the aim during the flood stages. The stages of the river were remarkable during the year 1906-7 for the comparatively high stages of

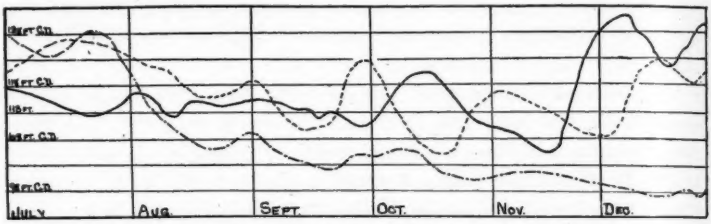

FIG. 1—HYDROGRAPH OF THREE LOW-WATER SEASONS AT LAKE PROVIDENCE.
———— 1906. — — — — 1905. —.—.—.—. 1904.
C. D. = CAIRO DATUM.

the low-water season, and for the early culmination of the flood stage.

The Low-water Season.—The river did not reach a very low stage during 1906. The lowest stage of the season was registered on November 16, when the Cairo gauge read 11.9 feet. During 1905, the lowest reading at this station was 11 feet, October 18; 1904, 3.1 feet, December 25. A study of the accompanying hydrographs of the low-water stages for the three seasons above mentioned at Lake Providence will show the variation of the river stages. During 1904, an almost consistent drop in stage is recorded to the end of December when the rise began. The 1905 hydrograph fluctuates throughout the season and reaches its lowest stage near the middle of October. The 1906 low-water season ended abruptly

* Compiled, largely, from the annual report of the Mississippi River Commission for the year ending June 30, 1907.

on November 16 by a sudden rise, and at no time during the season was there a shortage of water. The work done by the dredges during 1906 was considerable, however. A secondary rise of the river during the falling stage is generally strong enough to move the sand along the bottom into the channels. Thus these rises, while they furnish an additional supply of water and frequently come at an opportune time to relieve the embarrassment of the engineers, are not always unalloyed blessings. The October rise of the river (see hydrograph) increased the demand for dredging.

In consideration of the interest recently developed in the use of the river as a highway, the Commission is looking forward to an enlargement of its policy. As long as the protection of the inhabitants of the alluvial basin was a focal point of the work of levee construction and maintenance, the vision of a completed system was fast becoming a reality. It was to be expected that new levees would be required from time to time. In fact, the average life of the levees was reckoned at twenty years. By building the new levees at some distance from the banks they have in many instances out-lived their allotted time. This policy exposes the old banks to erosive action and thereby a constant source of detritus results. The low-water navigation is obstructed by the deposit of sand bars in the reaches of the river. If the scour on the deserted and exposed levees is prevented, the supply of bar-building materials will be diminished. Thus has arisen anew the recommendation for revetments for the protection of levees. The revetments, the Commission states, are such expensive works that it is only in extreme cases that use of them is permissible for the mere protection of levees. But now that the navigable channel is a desideratum the revetments, expensive though they are, must be considered as a method of preventing scour and the filling of the channel with sediment. The Commission directs the attention to Plum Point and the Lake Providence reaches where for sixteen years a plan of bank revetments was successfully pursued in order to regulate the low-water width of the river. This work, which was in the original plan of the Commission, had to be abandoned because of the limited appropriations. If the Commission is committed to the plan of holding the river in its present channels, as soon as hard and fast banks are made, the better for all interests along the river. The abandonment of a levee because of its threatened destruction and the building of a new levee farther back from the river not only must furnish the river with a large supply of sediment, but also by the shifting of the river by ever so slight an amount must cause a

scour in new and unprotected spots up and down stream from the abandoned levee.

It is not expected that such a policy will in any way put the dredging plant out of service. Neither dredging nor revetments of exposed levees alone can possibly supply the required navigable depth of waterway. Commissioner Taylor says,* in regard to the feasibility of maintaining a 14-foot channel by dredging, that with the present method and existing conditions the work would be enormous. The other extreme would be to make the sand bars so slight by revetting all the banks south of Cairo that dredging would not be necessary. This would demand according to Taylor a $100,000,000 appropriation at the outset. A combination of dredging and revetments, whereby scour will be diminished and less material be found in the bed of the river for the formation of bars seems to be a safe mean.

The success of the engineers in maintaining the required channel has not been met, however, with much response in the use of the river as a highway. "The failure of commerce to respond to the improved conditions of the channel which have been maintained for a number of years past is disappointing. It can be accounted for only on the theory that confidence in the permanence of the improvements still hesitates. To go on to more perfect mastery of the conditions, to hold the banks with greater security, to build and operate more powerful dredges if need be, and to increase the depth of the channel from year to year, will invite and stimulate that confidence without which the restoration and, much more, the large expansion of commerce on the river will be impossible."†

High Water Stages.—The flood of 1907 may be classed with the great floods. It was remarkable in the fact that a high stage was reached early in the year. The low-water season ended November 16, 1906. The river rose rapidly and in January, 1907, the gauge at Cairo recorded the highest stage experienced for that month, and the reading lacked only 1.8 feet of the highest known stage at that station. Unusually heavy rains occurred over the basin of the Cumberland, Tennessee and Upper Ohio rivers during January. The continuous character of the rain and the increased percentage of run-off, which generally obtains at this season of the year because of the frozen condition of the ground and the lack of most vegetative checks, so filled the Ohio River that the highest known stage of that river was nearly reached. This flood, emptying its waters into

* Taylor, R. S., "The Present Aspect of the Mississippi River Problem."
† p. 2624, Report of Commission, 1907.

the Mississippi at a time when the river was at a comparatively high stage caused the rise of the river almost to the danger point. It is always interesting to note how fine the line is between disaster and safety. If we can count on compensating occurrences to arise at every bank-full stage our levee system is safe. In times past, the limited area of rainfall has saved the levees; in 1903, the low stage of the river just before the flood rise was beneficial; in 1907, a cold wave came on and checked the rise in all the tributaries north of Cairo. The engineers of the first district laboured with difficulty in almost continuous rains and prevented a break into the White River basin by great efforts. Had not the weather turned cold on February 3 they infer that in spite of their labours a break would have occurred. As it was, the levees of the district were topped. The arrival of the cold wave prevented a greater flood and, furthermore, so checked the supply of water that the flood was of short duration in the upper portion of the flood plain area.

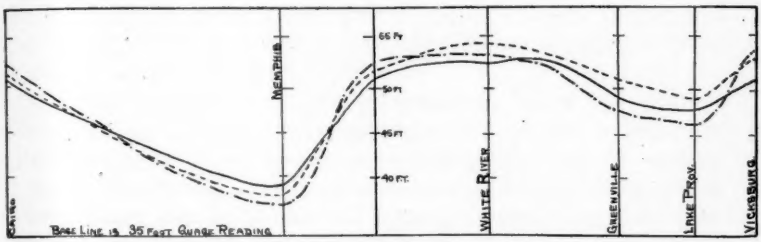

FIG. 2—PROFILE OF FLOOD CRESTS, CAIRO TO VICKSBURG.
——— 1907. — — — — 1903. —.—.—.— 1897.
VERTICAL SCALE EXAGGERATED.

The record in crevasses is remarkable. For a number of years the yardage of levees lost by flood has gradually diminished and during the 1907 flood but one crevasse occurred. This was about 28 miles below New Orleans in a location where no harm resulted. So unimportant was this break that the engineers decided not to close it at once, as the exposed ends had been protected from further wear and the river was falling. The loss by this one crevasse was about one-half of one per cent. of the contents of the existing levees. During 1906 the loss was nine-tenths of one per cent. During the flood of 1903 the loss was a little less than one per cent.

In comparing the 1907 flood with the 1903 and 1897 floods, figure 2, which is a profile of the three flood crests from Cairo to Vicksburg, shows a marked deviation from parallelism. The lower stage of the 1907 flood in comparison with the 1903 flood at White River

and Vicksburg is accounted for by the low stage of the tributaries at these stations, which allowed the flood to spread by running up the comparatively empty river beds. In other cases the departure from parallelism may be explained by the suddenness of the rise and fall and by the contraction or expansion of the river bed by the removal or replacement of dikes and levees. During March and April, a secondary rise of the river occurred which excelled the January rise in some portions of the Ohio River, but which fell four feet short of the first rise at Cairo.

WORCESTER, MASSACHUSETTS.

KASSNER'S METEOROLOGICAL GLOBES.*

BY

ROBERT DEC. WARD,
Harvard University.

I wish to call the attention of my colleagues of the Association of American Geographers to a new and, as it seems to me, valuable addition to the teaching equipment now provided in meteorology and climatology. Every teacher of these branches of science, and of physical geography in the large, has had frequent occasion to regret that the great facts of temperature, pressure and prevailing winds have to be learned from charts which, especially if these are on the Mercator projection, as is often the case, are very apt to give the student a distorted or unreal picture of the actual meteorological conditions, as well as of the relative sizes of the zones. Professor Kassner, who is one of the officials of the Royal Prussian Meteorological Institute in Berlin, and *Privatdocent* at the *Technische Hochschule* there, has recently constructed two "meteorological globes" which can be most highly recommended for use wherever meteorology and climatology are taught. These globes, which measure 34 centimetres (nearly 13½ inches) in diameter, show the temperature, pressure and prevailing winds for January and July on the basis of the latest and most complete data available up to the spring of 1907. The globes are well mounted, at the proper inclination, on a wooden base. A simple and very useful device makes it possible to turn

* Read by title before the meeting of the Association of American Geographers, held at Chicago, Ill., December, 1907.

the globes over, so that the south polar region is at the top, thus obviating the inconvenience which is encountered, in the use of the ordinary rigidly set globe, when one wishes to study the southern hemisphere, and especially the higher latitudes of the southern hemisphere. The price of the globes is 50 marks, and 3 marks additional is charged for packing. They may be purchased of Dietrich Reimer (Ernst Vohsen), Berlin.

Kassner's globes will unquestionably facilitate and simplify any instruction in which there is need of presenting the broad facts which they so clearly set forth. The seasonal changes and migrations can easily be seen by a comparison of the January and July conditions.

The distribution of pressure is shown by means of isobars in blue, drawn from 2 mm. intervals. The isobar of 760 mms. (29.92 inches) is heavier than the others. The pressures above 760 mms. are shown in solid isobars and those below 760 mms. in broken isobars. The great dominant areas of high and low pressure (the so-called "centres of action of the atmosphere") stand out very clearly, and it is easy to see why so much importance is now attached to these areas as controls of weather and climate.

Temperatures are shown by red isotherms. The critical isotherm of 0°C. (32° Fahr.) is especially emphasized, as are the isotherms for every even 10°C. Isotherms are drawn for every 4°C., and in places for every 2°C. Further, in order that the distribution of temperature may be more clearly seen, all parts of the globe over 0°C. are colored red, and all parts below 0°C. are colored blue, in the conventional way, different shades of red and blue indicating different grades of heat and cold. The darker shades show the greater extremes.

The prevailing winds are indicated by arrows, flying with the wind. The lands are shaded in grey, the higher elevations being emphasized by darker shading. Another useful point about these globes is the indication, by different symbols, of the location of the central stations of all meteorological services; of observatories, and of the more important meteorological stations the world over.

I desire, also, particularly to call the attention of my colleagues to Professor Kassner's *Anleitung zum Gebrauch der Kassner'schen Meteorologischen Globen, und zu Demonstrationen über die Raumverhältnisse der Atmosphäre,* a pamphlet of 6 pages. In this, under various headings, the actual values, and the relative values with reference to the size of the globes, are given for certain of the more important data concerning (1) the essential astronomical facts; (2)

the earth's rotation; (3) the height of the atmosphere; (4) the size and progression of low pressure areas; (5) cloud heights; (6) high balloon and kite ascents; (7) the altitudes of observatories; (8) the deepest boring for earth temperatures; and (9) the area embraced in the regular weather maps of the Deutsche Seewarte. This summary is not only useful in itself, but it adds greatly to the value of the globes for purposes of instruction. At the end several diagrams are given, which, in order to bring out the relative dimensions and areas with reference to the globes, are intended to be pasted onto papers of the proper thicknesses, and then to be applied to the globes. These diagrams represent (1) the height of cirrus clouds; (2) the average area covered by a typhoon; (3) the average area covered by an ordinary cyclone; (4) the area covered by the German weather maps; (5) the height of the atmosphere, and (6) the circle of visibility of luminous clouds.

It is to be hoped that Professor Kassner's excellent work on these globes will receive proper recognition in the United States, and that the globes will find a place in the equipment of many geographical and meteorological laboratories.

NIUĒ: A RECONNAISSANCE.

BY

WILLIAM CHURCHILL.

NIUĒ-FEKAI, traditional names Nuku-tu-taha, Motu-te-fua, Fakahoa-motu, Nukutuluea. Latitude (south point, Halafualagi), 19° 10′ S, longitude, 169° 17′ W; length (N-S), ca. 17 miles; width (E-W), ca. 11 miles; perimeter, ca. 40 miles; average elevation, 220 feet. Population: Polynesian; mission census 1899, 4,576, distributed as follows in village communities—Alofi, 719 and 49 students at the mission school; Tamakautoga, 275; Avatele, 401; Fatiau, 104; Hakupu, 456; Liku, 383; Lakepa (or Tamalagau), 234; Mutalau, 524; Hikutavake and Tamahatokula, 248; Tuapa (or Uhomotu), 426; Makefu, 196; absent on foreign islands, 561. British Residency, Alofi; head station of the London Missionary Society, Alofi; residence of the Patu-iki (king) Togia-Pulu-toaki (anointed June 30, 1898), Tuapa. First set upon the charts by Captain Cook in his second voyage, sighted June 20, 1774, landed June 21 at Opahi, named Savage Island. First mission visit, John Williams in the *Messenger of Peace*, July, 1830, at Falekula; first resident European missionary, Rev. W. G. Lawes, 1861, at which time the whole island, save 8 persisting heathen, had been converted by Samoan teachers. Annexed to Great Britain, April 20 and October 19, 1900; annexation transferred to New Zealand, June 11, 1901.

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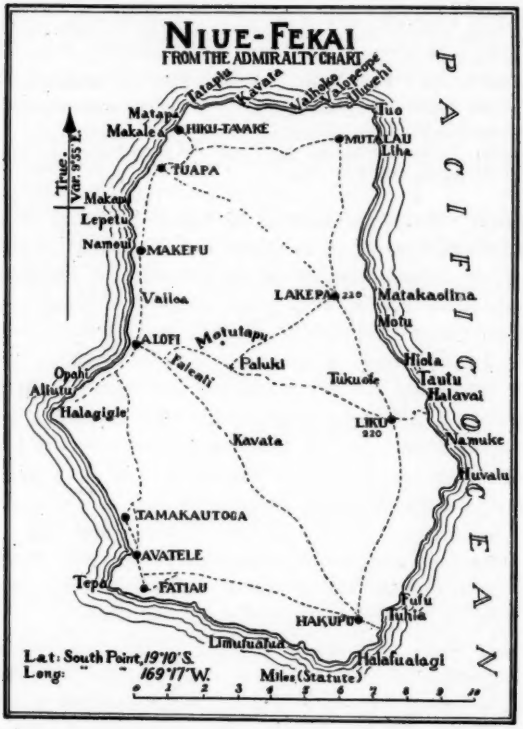
Overlaid by the impertinences of names given by discoverers in honor of themselves or of their patrons, the charts of the Pacific yet disclose in abundant measure the working of the lust of the eyes and the pride of life, that great charm with which the South Seas have ever drawn wandering men, the best no less strongly than the worst. In the former category it has been sought to commemorate Anna Maria and Rimsky Korsakoff and Sarah Scott and that noble lord whose sufficient fame may properly rest upon his invention of the sandwich. On the other hand, see how the joy of the South Seas smiles out from such names as Anse des Amis, Bay of Bon Accord, Buenos Jardines Island matched by Paradise Island, Pleasant Island, the Friendly Islands, Gente Hermosa. It is a strange contrast, well nigh unique in the Pacific tract, to meet with the stern name Savage Island which Cook bestowed upon Niuēfekai, or Niuē as it is more commonly denominated.

Cook had reason. He made a landing at two places on the west coast of the island and at each he was fiercely attacked by the islanders. His experience was not singular. Since his time and until the conversion of the inhabitants most landing parties, whether from armed vessels, from whalers and traders, or even the mission ships, have been attacked and beaten off. So far as Niuē retains traditions of its past (and it is in singular contrast with the other Polynesian lands where the past forever lives on the tongues of present men) there is the same story of resistance to the landing of the hardy wanderers of the Pacific of their own stock. Niuē has reason for this repelling front set toward visitors. They know that their small, waterless and infertile island is none too large for their own

natural increase and that little space can be spared for colonists. Further than this Niuē had learned to dread contact with the world outside whence came at intervals epidemics of influenza quite beyond the resources of their home medication, for their most ancient history had taught them that outer visitors meant stricken homes and dear ones gone. Small wonder, then, that when a sail was spied in the offing the Niuēan, not from innate ferocity but from prudence,



grasped his *katoua* or wooden sword, stuffed his war girdle with *maka-pou-ana* or throwing stones, crammed his bushy beard into his mouth to make his visage more terrifying and took his stand upon the beach to defend his home.

Niuē is of a type seldom found among the myriad islands of the South Seas, the raised coral land. Such as are known occur uniformly at the border of one of the great masses of vulcanic extrusion. Niuē is an offshore outlier of the great Tongafiti Y which

may easily be traced on the bathygraphic charts of the South Pacific. Its lower stem rises high above the level of the sea in the two great islands of New Zealand. Its continental unity is continued northerly at no great depth to a little beyond the Kermadecs and there forks in the direction of the two archipelagoes which make its name appropriate in the best Polynesian usage, Tonga and Fiji. It is off the eastern or Tonga arm that Niuē has undergone the mighty travail of a world in the making.

My own notes of the physiography not only give me no warrant to alter the record of Percy Smith's observations, but they rather qualify me to express a cordial appreciation of their accuracy. He is a geographer of such secure attainments as might be expected of one who served as Surveyor General of New Zealand until the march of years permitted him to retire to the uninterrupted study of Polynesia, which had been the pursuit of a lifetime and which qualified him as the first British Resident on this island to formulate the simple system of law through which its order is preserved. In these words he presents the structural picture of Niuē:

"The island has been raised by several efforts of the subterranean forces, as is plainly visible in the terraces which surround its shores. These elevations have been unequal in character and extent, and practically may be reduced to two. The earliest caused the central part of the island to rise about 130 feet, and thus it remained for ages, the wide terrace on which most of the villages now stand being at that time the encircling or fringing reef."*

The other great elevation raised the island a further height of about 80 to 90 feet, since which time little change appears to have taken place beyond the eating of the surf into the cliffs of coral. There are indications here and there that the island was once an atoll, with probably a very shallow lagoon now shown by the brown reddish earth of the centre of the island, which is formed of very much decomposed coral rock. This reddish earth is a feature of other raised coral islands as noticed by both Darwin and Dana. Where not occupied by this reddish earth the surface of the island is extremely rocky, the gray weathered surface of the coral showing in fantastic rugged masses that make travelling off the paths very difficult indeed. The island may be likened to an inverted soup plate, in which the rounded edge represents the lower terrace, the rim the old margin of the lagoon, and the bottom the level or undulating surface of the old lagoon. Coral (*feo*) is the only rock to be found on the island—there is no sign of any volcanic rock whatever. It decomposes into a fertile soil in the hollows of the rocks, more so than the reddish earth, which is not so rich but yet often

* A close examination of the terrain at frequent intervals at the foot of the older terrace leads me to the conclusion that this old reef was wholly a fringing one.

supports a dense vegetation. The second elevation of the island appears to have been of a more sudden character than the first, for it was probably during that period that the series of longitudinal chasms were formed that so frequently are found at the foot of the higher terrace—the old shore line, in fact, before the second elevation. Some of these chasms are very picturesque, overhung as they are by the rich vegetation of the tropics and frequently containing in the bottoms pools of water which serve as the water supply of the people. It is along this lower terrace—which may average about one-third of a mile in width—that six out of the eleven villages are situated.

The present reef of the island is a fringing one about 60 to 80 yards in width, with numerous passes through which, at least on the western side (for that lies to leeward during the eight months of the southeast trades), landing may be made. The subterranean conditions of the Niuē foundation may be elucidated by a study of the borings made at Funafuti.

Economic vegetation is naturally conditioned by terrain. The soil is thin and either has not formed a stratum of proper humus or has not been able to retain such against the torrential rains. Arable patches, therefore, must be sought in chasms and depressions and when found are of restricted area. The island has no streams, its water supply consisting wholly of catchment pools and wells of infiltration water which has lost its saline constituent in passing from the sea through the porous coral rock. Largely covered with timber the island shows primeval forest, second growth groves on spots of abandoned cultivation and newly opened gardens. In the latter are raised the great Polynesian food staples, the yam, the taro, the plantain, the coconut and the arrowroot. But the difficulties of nature have advanced the Niuēan further toward the agronomic arts than others of his race, who live under a more bountiful nature which invites simply to reach out and pluck of her abundance; here man must labor for his sustenance, a condition of life not without its moral effect upon the people.

The only mammals are the rat and the bat, the former being deliciously edible, the latter susceptible of being made palatable. Birds abound, among them being that Pacific Carpophaga pigeon which is a worthy addition to any bill of fare. Fish are numerous and contribute largely to stock the larder.

The domestic arts of the kitchen have developed along the same lines as with other members of the race. Viands are cooked in pit ovens in leaf packets. There are many varieties of the so-called

puddings, made dishes of the several vegetables mixed with salt water or the water of the coconut, many of which are far from unpalatable. That their pleasures of the table might assume Gargantuan proportions is shown in this fact, one which rests on no hearsay evidence. At the feast over the opening of the new church at Liku one of the viands was a taro pudding of 220 yards length. The stones of the oven in which it was baked are there yet in situ and have been measured with Gunter's chain.

The arts and customs of Niuē are those of Polynesia at large, yet a few exceptions are noted which challenge the attention because of their singularity. The most noteworthy of these exceptions are the absence of tattooing and the neglect to drink the kava which grows spontaneously on their island. The great importance of these omissions lies in the fact that it serves to point out the time when Niuēan settlement parted from the general family of advancing Polynesians. The inference is beyond doubt a just one that it was before these two customs had become engrafted upon Polynesian life. I shall not venture as yet to assign a date to the arrival of these two great features of the life of the Polynesians, for my studies in the coordination of the legends have not progressed to the stage of anything like positive date determination, but I have abundant myth-history showing that there was a time when the Samoans came into possession of both these arts by acquisition from westward neighbours of the Melanesian stock.

Comment has already been made in passing upon the scanty possession of historical traditions by the Niuē folk. It was a fortunate thing that Percy Smith has given particular attention to the study of Polynesian origins, for when he assumed his official station at Alofi he lost no time in securing from the wisest men of Niuē the fullest account of the story of the settlement of the island and of the succession of their Patu-iki. This record he has published with translation and comment and for that alone his narrative would be commendable even if it did not contain, as it indeed does, all those other elements of the record of intelligent research which make it truly a monograph of the most satisfactory type. The people of the island yet retain the distinction into Motu, the primitive settlers, and Tafiti, newcomers of a later migration. They preserve the knowledge that they came from Tonga, from Fonua-galo, from Tulia. The two latter prove nothing, and Tonga is everywhere along the track of Polynesian swarming, it is a directive rather than a place name, for the present Tonga is distinctly contra-indicated. We must omit the ingenious and forceful argument by which our author makes out

an excellent case for Samoa as the swarming point of the Niuē peoples. The results which he reaches are to be found in the two following extracts:

"Now I take it to be somewhere in the above period, *i. e.*, from the eighth to the thirteenth century, that Niuē received its first inhabitants. It was probably after the commencement of the great voyages which led to a knowledge of most of the islands in Central and Eastern Polynesia—and this was approximately that year A. D. 650. We may say tentatively that Niuē was first occupied by the Motu people in about A. D. 700. The reason I fix on this date is that the people have many of the traditions common to the race the period of which is prior to A. D. 700, but so far as I gathered none of a later date that are not merely local. Many of the great heroes of Polynesian history are unknown to the Niuē people because they flourished after the migration to Niuē."

"As to the origin of the Tafiti people it seems to me probable that they were some of the Tonga-Fiti people who occupied the coasts of Samoa and were expelled from there at the time of Matamatamē or when Savea became the first king of all Samoa and received the name for the first time of Malietoa. This occurred, according to the several Samoan genealogies, about the year 1250, or about 550 years after the arrival of the Motu people at Niuē. This period is characterized in Polynesian history by the close connection of the Polynesians with the Melanesians in the Fiji group, when intercourse was frequent and intermarriage constant. Hence the greater Melanesian strain in the Tafiti people than in those of Motu. It is due also to this Melanesian intercourse that the large number of Tongan words with some of their grammatical forms was introduced into Niuē, gradually overriding and replacing much of the purer Polynesian dialect spoken by the Motu people, the traces of which are still apparent in their old songs."

Thus are we led to the final work of this Niuē series, the dictionary and grammar. In this work Percy Smith enlisted the collaboration of another past president of the Polynesian Society, Edward Tregear, an indefatigable laborer in this interesting field and the author of the dictionaries of Mangareva and the Paumotu, as well as the Maori Comparative Dictionary, a work without which study of the philology of the South Seas would be well nigh impracticable.

The vocabulary is excellent and will be found to shed a new light on the primitive signification of words in other languages of the great Polynesian family which in illiterate ages have lacked the record of their growth into widely diverse meanings. This vocabulary has its base in one compiled by Rev. F. E. Lawes, the present resident missionary at Alofi, to which the present authors have added many words derived from a collation of the material brought back by Percy Smith from Niuē and from a reading of the translation of the Bible undertaken by Mr. Tregear.

The grammar is the work of the two Messrs. Lawes who have devoted their lives to the education of Niuē. It is brief and negligible, for it is based upon an entirely impossible conception of the language. Hitherto all the attempts at grammars of Polynesian tongues have been modelled upon the grammar of English. The first attempt to develop the grammar of any Polynesian language as a speech of isolating type is the comparative grammar of the Samoan upon which I am now engaged. This will establish the principles of the language and may readily be applied to any of the tongues in the Polynesian Pacific.

ON THE MACKENZIE RIVER.

BY

V. STEFANSSON.

When the writer was invited to become ethnologist of the Anglo-American Polar Expedition and to undertake a study of the little-known Kogmollik Eskimos living on the Arctic coast east of the mouth of the Mackenzie River, he accepted on condition that he be allowed to go north by river instead of sea. The expedition's ship, the *Duchess of Bedford,* was to sail from Victoria, British Columbia, in May, 1906. To reach the seat of the proposed investigations she had to sail north through Bering Strait and east along the north coast of Alaska, a great distance through difficult waters. It sometimes happens that whaling ships more powerful than the exploring schooner are caught by the ice in the neighbourhood of Point Barrow and are unable to penetrate to the mouth of the Mackenzie. That this might happen to the *Duchess* (as it did happen) was evident. The alternative was that the ethnologist should, instead of accompanying the ship, go overland through Winnipeg and Edmonton and down the great rivers of the Mackenzie system directly to the seat of operations. If the ship should arrive she could pick him up at Herschel Island near the river's mouth; if she did not arrive, he would shift for himself as best he could and have the rather rare privilege of being for a year an Eskimo.

The Mackenzie is a little-known river, flowing to the Arctic about parallel with the Rocky Mountains, of which one has occasional glimpses to the westward. Measured from Athabasca Landing, near Edmonton, where the river trip begins, the journey takes one through over two thousand miles of territory known only to the trapper, fur trader and Indian, and that along a river which impresses one as larger than the Yukon, though possibly slightly smaller than the Mississippi—the least-known large river of the Western hemisphere, one of the most picturesque of the great rivers of the world.

For many years this journey had been one of my dreams, not only as a traveller but as an ethnologist, for here live the least-known Indian tribes of North America in most nearly their primitive condition. Occasional travellers have followed this route in recent

years, but most of them have been stopped by Slave Lake, a thousand miles south of the delta, and so little has been written about the mighty river that we are still reading Mackenzie's journal of his voyage in 1789 as the best account of it to date, though the work is scarcely a model as an explorer's journal.

To the railway terminus in Alberta one goes in Pullman cars, but beyond Edmonton the journey begins to take on an aspect differing somewhat from everyday travel. We reached Athabasca Landing in two days and a half of moderate driving through a rolling, fairly wooded country, sections of which were evidently well suited to farming. We had our meals at log cabin "road houses" and slept at night on the floor, rolled in our Hudson's Bay "four point" blankets.

ATHABASCA LANDING, THE INITIAL POINT OF THE RIVER ROUTE TO THE ARCTIC.

Athabasca Landing, situated ninety miles north of Edmonton on a southward curve of the Athabasca River,* is the initial point of the great river route opening up the vast fur territory of Northern Canada—a section still rich with the romance of primitive commerce; a country where black fox skins are bought with 300 pounds of flour, to be sold for 300 pounds sterling in the London market. The figures may seem to the stay-at-home to indicate profits beyond the dreams of a trust organizer, but the traveller, who accompanies a scow load of the Hudson's Bay Company's goods down eighteen hundred miles of alternately turbulent and sluggish rivers and

* The Athabasca is considered to be the Upper Mackenzie.

across inland seas where one is a day and a night out of sight of land, sees the matter in a different light. The fact that the "Great Company's" shares are not in the market is due less to huge profits in the fur trade than to the fact that their millions of acres of farm and city lands are rising in value sometimes as much as a hundred per cent. annually.

Formerly the Hudson's Bay Company owned the larger part of what is now the Dominion of Canada. They made such laws as were necessary to protect their own interests and keep peace and order within their borders, they carried on the American side of wars with France and protected themselves with the blood of their servants against competitors in the fur trade—notably the enterprising North West Company. But in 1869 the Company sold to the Canadian Government the larger part of their holdings of 2,300,000 square miles and retained only one-twentieth of the "fertile belt" lying east of the Rockies between the Saskatchewan River and the United States boundary, or about 15,000,000 acres. Besides this, they retained a block of 3,000 acres around each of their trading posts—posts that have grown into such cities as Winnipeg and Edmonton, where town lots sell for a hundred thousand dollars each. Manifestly, a commercial company could not have grown into a populous empire. To have given away ninety-nine hundredths of the Company's land holdings to gain on the remaining hundredth the increment in value brought by a dense population, would have been a stroke of good financiering. The cash selling price need not, therefore, be considered so very small, though the Company received only £300,000, or a little over half a dollar for the square mile.

With the sale of their land came competition in the fur trade of the north. But the Company had so long been father and mother to the Indian that their hold upon him and his dependence on them have been difficult to weaken. Still, competition has grown to some proportions. In the summer of 1907 an independent trader (and by no means the only competitor) in the Mackenzie Valley sold his previous winter's purchase to a London fur buyer at the reported figure of $105,000.

The afternoon of June 8, 1906, we left Athabasca Landing aboard the stern-wheel steamer *Midnight Sun*. This vessel had a draft of about 18 inches and, on account of the shallow character of the river, carried no considerable cargo on board, but pushed in front of her and by her sides five freight scows and two small boats intended for the navigation of Great Slave Lake.

Besides a number of the Company's officers and servants bound

for various stations in the North, there were ten passengers aboard. Five of these were going with us only 250 miles to Fort McMurray, where they intended drilling wells for petroleum. Miss Wilgress and the Rev. Mr. Winch were missionaries of the Church of England going to Hay River and Fort Norman respectively. The only passengers, besides the writer, who were going the full length of the Company's trade route were Mr. E. Stewart, chief of the Forestry Department of the Dominion Government, a man whom a lifetime in the forest and on northern rivers had made a model traveller, and Mr. Pritchard, an officer of the Mounted Police, going to his station at Fort Macpherson, beyond the Arctic Circle.

Eighteen miles north of the landing we crossed a line of significance in the government of the North—the so-called "liquor boundary." North of this line no liquor may be sold; individuals who wish to take intoxicants across it must get special permission from the authorities for doing so, and even then are allowed only five gallons in any one year. From this circumstance five-gallon packages of liquor shipped into the north are known as "permits." These are considered particularly valuable freight, and are subject to special risks of breakage during transit.

A phenomenon which had already become familiar to us on our drive north from Edmonton was that of forest fires and the desolation and ruin left by those of former years. Along the entire course of the Athabasca and Slave rivers are forests of commercial value—abundantly sufficient to supply building material and fuel for the coming settlement of the country. Even below Slave Lake there are trees of considerable size, the Mackenzie delta itself showing far within the Arctic Circle spruces 18 inches in diameter two feet above the ground, straight and sixty to seventy feet high. But tens of thousands of acres of these forests are temporarily, if not permanently, injured each year by fires due, in some cases, to the carelessness of whites or Indians, and occasionally (especially along the lower Mackenzie) by fires wilfully set to make the caribou country more open and easy for the hunter—the Indians not seeming to realize that the fire is far more efficacious in destroying the fur animals and driving off the deer than it is in opening the country for the hunter.

The traveller north of Edmonton, as in some other sections of Canada, frequently sees along the rivers and trails conspicuous evergreen trees that have been stript of their branches from a point near their middle to a few feet from the top—the "lop stick" of the northern trapper and trader. These are made to commemorate

some event or person, and their meaning, though not inscribed on them, is well known to the people of the region: this one is to commemorate the capsizing of a canoe, that one to call to mind the killing of a moose or the death of a hunter. Memorials of this sort form a complete chain down the rivers of the Mackenzie system, across the portage to the Bell River and down it and the Porcupine to the Yukon. Some of them commemorate tragedies of the Yukon gold rush of 1897.

On the Athabasca, even with our light draft of 18 inches, men had most of the time to be stationed in the scows in front taking soundings with poles. We frequently scraped bottom on the water-rounded boulders of the river bed, and twice in 165 miles bumped so violently that the steamer sprung a leak and sank—a thing not very dangerous to life as the craft did not have far to settle before touching bottom—in one case only some four inches.

To reach the Grand Rapids of the Athabasca the *Midnight Sun* carried us 165 miles in fourteen days, or an average of 12 miles per day—perhaps a low record in down-stream steamboat navigation. It was an initiation likely to impress on one the fact that time schedules in the North should be rather more liberally interpreted than those of suburban trains; we learnt early the significant lesson that a week lost in the fur country means no more than the closing in a New Yorker's face of the door of the starting subway train.

June 20 brought an event which most of us felt as a tragedy—the death, after a brief illness that no one considered serious and some thought affected to escape work, of our steward, Herbert Bray, an Englishman. He was buried the next day on the left bank of the river two miles south of the Grand Rapids. The funeral service of the Church of England was read by the Rev. Mr. Winch; Mr. Stewart cut the name of the dead into a living spruce at the head of the grave, and I climbed the tree to make him a lop-stick memorial. The North forgets slowly and the grave will long be recognized.

At various points along the Athabasca are traces of coal tar, and in places streams of the substance trickle down high cut banks into the water, while, on a warm summer day, the smell of the stuff fills long sections of the narrow valley. This has been an incentive to private enterprise and government action and wells have been sunk, notably at Pelican Rapids and at Fort McMurray. At the rapids the well struck a flow of natural gas that stopped further operations. This was several years ago, but the gas torch which the workmen lit at the time is still burning, flaring twenty feet in the air through winter blizzards and drenching storms. The effect of com-

ing around a bend in the river on a dark night and floating into its circle of flickering light and dancing shadows is likely to quicken even a sluggish imagination. The Canadian Department of Geology has left a symbolistic memorial of its work—the torch of science lighting the way northward to the forces of agriculture and industry that must soon come to take possession of the land.

The Grand Rapids, which stopped the further progress of the *Midnight Sun,* are an impressive sight. The river here has a fall of about forty-eight feet in less than half a mile of foamy tumbling among huge boulders on either side of a little rocky islet near midstream. The main channel is to the west and has never been navigated; the practicable channel to the east looks bad enough—cer-

LOOKING SOUTH UP ATHABASCA RIVER AT GRAND RAPIDS.

tainly worse than the White Horse Rapids of the upper Yukon, that have long ago counted their fifty human victims. But the difference is that on the Athabasca a boat never goes through without an experienced river man at bow and stern and stout rowers at the oars, while in the fever days of the gold rush on the Yukon inexperienced men, confused amid the tumble of the whitecaps, not infrequently steered their boats against rocks of which the current would have kept an unmanned boat clear.

The Grand Rapids are the first of a series extending a hundred miles towards Fort McMurray. For this stretch both passengers and freight are transported in small boats; it is perhaps the most interesting portion of the entire northward journey. In our case

the passengers and Company's servants were carried in the York boats—seaworthy craft built for navigation on Great Slave Lake. We had good oarsmen and the best steersmen—besides, a York boat is easier to manage than a freight scow. The result was that we rode through some interesting looking rapids with a feeling of comparative safety, though one or another of the twelve freight scows occasionally struck a rock and sustained serious damage. The sinking of a scow means the loss of the perishables going to some certain post. The trader there, as well as his Indian customers, will accordingly have to do without tea and sugar for a year. Sometimes, too, dress goods are damaged by becoming wet. Most of those taken into the country are of excellent quality. In the case,

THE FLEET OF FUR TRANSPORTS ON THE ATHABASCA ABOVE FORT McMURRAY.

however, of one of our scows that sank near shore some of the goods were not fast colour, and their mutual interchange of hues produced mottled and spotted effects that may have been too much for the Indian matrons, fond though they be of gay colours.

In the main our river journey towards the Arctic, so far as the hours afloat were concerned, was delightful; but few even of those endowed with vivid imagination can form an approximate idea of what a trial to man and beast summer ashore is in the northern forest. An experience with mosquitoes gained on a spring evening in New Jersey furnishes only an inadequate basis for comparison. Where attempts are made to keep cattle, these become skin poor during the summer, leaving their smoke-filled stables only

seldom for a few mouthfuls of grass and then rushing back to the partial protection of the smoky stalls. There seems no reason to doubt the often repeated statement that young cattle tethered out of doors have been killed by flies in a week. The wild deer are so worried with mosquitoes, black flies, "bull dogs" and sand flies that their marrow turns fluid by midsummer and their flesh becomes exceedingly unpalatable.

A house can be closed more or less effectively against these pests, and when one is in mid stream on a big river they are not very troublesome. On shore one has to wear a veil of close-mesh netting kept away from the face by the hatbrim and tucked under the coat collar; thick gloves or mittens must be worn on the hands and no thin clothing anywhere, for the sting of the mosquito is long and sharp. Many concrete statements can be framed to indicate roughly how thickly they swarm under favourable circumstances; one that is occasionally met with in sportsmen's accounts of their experiences in the North is not easily improved on, for they have recorded having great difficulty in killing game because the mosquitoes, though shaken off the rifle barrel, settled back so quickly on the sights that it was practically impossible to take aim. The present writer has not had this identical experience, but he is in no haste to express doubt as to the truth of a statement so often reiterated.

Game of various kinds seems rather abundant along the Athabasca; both deer and moose tracks are frequent and lynx are often seen swimming the river. At the Grand Rapids we killed a large moose and farther down the river took occasional pot shots at black bears prowling along the hillsides. It is said that a party seldom traverses the stretch between the Grand Rapids and McMurray without seeing several bears. There are few places in America, if any, where bears are so numerous.

On the whole, we made much better progress in the small boats than we had done previously by steamer and reached McMurray the afternoon of June 30 to find the steamer *Grahame* there waiting to take us onward. This was the most sumptuous craft with which we came in contact and had seating space at the tables to accommodate the entire party at a single sitting. So particular were they here that it was not considered good form to appear at dinner at the captain's table in one's shirtsleeves.

But surely, if dressing for comfort rather than form is ever warranted, a light garb should be allowed the summer traveller in the North whenever the mosquitoes permit it, for the heat is intense and pretty uniform. For several consecutive afternoons on

the lower Athabasca the thermometer stood at over a hundred degrees in the shade and about 120° in the sun, while the gradually heightening latitude lengthened the period of sunlight and shortened the cool period of the night. The effect of this intense heat and long hours of sunshine upon the growth of vegetation was marked. On June 18 we found ripe strawberries at the Pelican Rapids, about 200 miles north of "civilization;" July 15 we were given excellent raspberries from the Catholic Sisters' garden at Providence, a thousand miles from the railway terminus at Edmonton. The strawberry season at that place was just over and only a few berries remained on the vines in the little garden. A field of barley here was fully headed out and this crop was said to be a success in most years. Six hundred miles farther north potatoes are grown at Fort Good Hope, about twenty miles south of the Arctic Circle.

TRACKING FREIGHT SCOWS UP THE ATHABASCA RIVER, BETWEEN FORT McMURRAY AND THE GRAND RAPIDS.

The tireless energy of the Catholic missionary and his assistant the "lay brother" has borne much fruit for good in the development of northern Canada. There was a time when it was believed potatoes could not be successfully grown at Winnipeg. From that point the missions have pushed northward the boundary of the agricultural domain through more than ten degrees of latitude; the farmer has already followed more than half that distance and he will soon go all the way, for it cannot be so very long till the belt of land stretching parallel to the Slave from the Peace River to Great Slave Lake will be settled. The "Arctic Desert" of Canada is gradually shrink-

ing (though it may never fade from the map quite so completely as the "Great American Desert" of the middle nineteenth century) and Canada is coming into her own. The feelings of the Canadian who travels to-day through the region to the north and west of Edmonton are probably not very different from those of the American who crossed the plains westward in "Forty-Nine," and the Canadian's dreams have hardly greater need for restraint. The time is likely to come within the first half of the century when the provinces east of Lake Huron shall bear about the same relation to the rest of the Dominion that the States east of the Appalachians bear to the Union as a whole.

The evening of July 2d we left McMurray, and crossed Athabasca Lake the forenoon of July 4, tying up for most of the day at Chipewyan, the metropolis of the fur country. At this place is located the only Mounted Police post between Athabasca Landing and the Mackenzie delta, a stretch of over fifteen hundred miles. There are here missions of both the Catholic and Anglican Churches and about forty neat dwelling houses occupied chiefly by mixed bloods and Indians. The reason for a considerable delay at this point was that the weather was stormy; the *Grahame* is unable to face rough weather on the lake and always watches for an opportunity to "dodge across" when the water is smooth. July 5 we came to the mouth of the Peace, which impresses one as being about the size of the Missouri; on the evening of the same day we reached Smith Landing, at the beginning of a sixteen-mile series of rapids, around which goods and passengers are portaged by horse and ox teams to Fort Smith.

By July 11 the *Grahame's* freight had been transferred to the little screw steamer *Wrigley,* that was to take it the remaining thirteen hundred miles to Macpherson. Those familiar with river navigation will gain considerable respect for the Mackenzie from the fact that it can be navigated throughout its entire length, even at seasons of low water, by a screw steamer that draws seven feet loaded, and this in a river that has not been buoyed and is not carefully surveyed yearly for the location of shifting sandbars. At one point the stream has a depth of sixty fathoms. Here, therefore, is a river capable of meeting the demands of commerce even better than the Yukon has done, should mining or any other industry make it necessary.

After boarding the *Wrigley,* northward progress was rapid. July 12-14 we visited Fort Resolution and the Anglican Mission at Hay River, and then crossed Great Slave Lake—a body of water some-

what larger than Lake Huron or Lake Erie of the Great Lakes system; July 20 we crossed the Arctic Circle, and on the 21st we arrived at Fort Macpherson on the Peel River, the most northerly trading station in the interior of Canada.

At this point I first came in definite contact with the Eskimo who were to be my companions and housemates for a little over a twelvemonth, and the impression was as favourable as it continues to be to the present time. I had, of course, long ago left behind some of the misinformation acquired from the school geography and popular literature, but I here began learning an important lesson which books had not been able to impress upon me south of the parallel of forty-nine—that these people are friendly, companionable and intensely

LOOKING SOUTH-EAST FROM FORT SIMPSON TO THE CONFLUENCE OF THE LIARD AND MACKENZIE RIVERS.

human; my inferiors, it is true, in many ways, but my superiors in not a few of those things that matter greatly anywhere. They seemed to consider me as neither their social inferior nor superior, an attitude with which I am well content. No more than the children in a good friend's house are they my inferiors, because certain facts and abstruse theories have never had a part in their lives.

The evening of July 30—for in the land of nightless days one usually travels "at night"—we started on the last lap of the northward journey. We had two boats, and the expedition was under the command of an Eskimo, "Captain" Roxy. The company consisted of Roxy's family of four, five Loucheux Indians, two miners bound for the outside world by way of the Herschel Island whaling

ships, Mr. Walker of the Mounted Police, going to his station at Herschel Island, and the writer. We were all under Roxy's command and took our orders from him quite naturally. The miners, who were used to dealing with Indians on the Yukon, seemed to find the situation incongruous at first, but soon got used to it. Though I afterwards found this particular Eskimo rather sharp in his business dealings and am inclined to classify him as a "confidence man," I still consider him admirably adapted to commanding a party such as ours under similar circumstances. He is energetic, resourceful and an admirable sailor. Late in September we came near being drowned together, running a whaleboat thirty miles down a harbourless coast before a howling gale. It is not easy to forget

FORT WRIGLEY, A TYPICAL FUR-TRADING PORT IN THE FAR NORTH.

him sitting in the stern singing comic songs while three of us bailed for our lives, nor how he handled the tiller. When we ran into quiet water and the danger was past, his trembling hand and ash-grey face showed that the courage which took him through was no mere recklessness. But that all belongs to a different chapter of the story.

On reaching the delta mouth it was found that only one of our boats was seaworthy. A large part of the police stores we were carrying had therefore to be left behind under the charge of Mr. Walker and two of the Indians. After several days of tacking against adverse winds and twice being delayed by stiff gales, we reached Herschel Island August 10, bringing to the imprisoned

whaling fleet the story of the burning of San Francisco, the port as well as home of many of the officers and men. Captain Amundsen's little sloop, the *Gjöa,* was also in the harbour, but left a few days later to finish her now famous voyage of the North-West Passage.

GEOGRAPHICAL RECORD.

AFRICA.

ARTESIAN WELLS IN THE SAHARA.—The French are still energetically reclaiming desert lands by means of artesian water supplies. According to the *Revue Générale des Sciences* the results of sinking wells in southern Algeria are very satisfactory. In the winter of 1906-7, about 7,500 gallons of water per minute were thus added to the available supply in the territories of Tuggurt, Ghardaia, the Saharan oases and the route between El-Arich and Berguent. This supply was sufficient for the irrigation of nearly 2,000 acres of palm groves containing approximately 120,000 trees and yielding an increase of revenue to the proprietors of about $80,000 per year, in addition to the value of subsidiary crops which can be raised in a grove, including forage plants, vegetables, and fruit trees. In the region of the Wady Rir a new well gives the exceptional supply of 2,600 gallons per minute, irrigating the old palm groves around it and permitting the formation of a new oasis of more than 30,000 palms.

COTTON CULTIVATION IN THE SUDAN.—As the cultivation of cotton may become important in the Anglo-Egyptian Sudan, some facts on the subject supplied by the Sudan Agency are of interest. Land may be bought either from the natives or from the Government, but purchases from the natives are not encouraged, as they are prone to dispose of all their land and become destitute. The areas of governmental land, suitable for cotton cultivation on a small scale, are insignificant, but, in special cases, the Government arranges concessions on a large scale. At present, the condition of the labour market hardly warrants any increase in the number of concessionaries beyond those who have already made application. The applicant must satisfy the Government that he commands sufficient capital to develop the land, and he is required to bring into cultivation a certain area each year and carry out specified works to the satisfaction of the Government. After he has brought the land under cultivation and fulfilled the obligations of the lease, he has the option of purchasing the land.

BOUNDARIES OF GERMAN EAST AFRICA.—*Die Mitt. aus den Deutsch. Schutzgebieten* (Vol. xx, part iv) describes the astronomical and geodetical observations made in 1902-5 by the German Commission for fixing the boundaries of German East Africa. The first report is given to the Lake Kivu expedition under Capt. Herrmann, with Prof. Lamp as astronomer. The two other reports give the results of the German-Uganda boundary expedition under Captain Schlobach. On the Kivu expedition, Prof. Lamp established an astronomical station at Usambara and determined a value for its latitude. Full tables are given of the geodetic

results obtained in the neighbourhood of Lake Kivu, which, with the figures supplied by Captain Schlobach, furnish the data for the triangulation of a map of the district west and north of Lake Victoria. Triangulation was continued east of that lake from a base at Port Florence, the work being carried as far as Kilimanjaro and thence connected with Zanzibar. The accompanying map shows the boundary line between British Uganda and German East Africa from lake Victoria to Kilimanjaro. Accounts are also given of the altitude measurements made by both expeditions.

THE ORIGIN OF THE BANTU.—The Government of the Cape of Good Hope supplied the means that enabled Mr. J. F. Van Oordt to give three years of close study to the Bantu question, and has also published his results under the above title in a pamphlet of 97 pp., which the Colonial Secretary has sent to the Society. The author calls his paper merely a preliminary study, but he believes he has found clues that will help to unravel the secrets of Bantu philology and of the institutions, customs, and religious ideas of that widespread race. Briefly, his philological studies have convinced him that the Bantu languages belong to the linguistic group generally known as the Ugro-Altaic; and he thinks he has discovered that the original home of the Bantu was the peninsula of Malacca, and that the present pagan races of that region are ethnographically and linguistically related to the existing Bantu races of Africa. The larger part of the paper is given to his comparative philological evidence. He expects to make further researches along the lines he has opened.

AMERICA.

DETERMINATION OF THE HEIGHT OF ACONCAGUA.—In 1904, Mr. F. R. Schrader, the well-known French geographer and cartographer, visited Mount Aconcagua, to attempt a final settlement of the long-disputed question of the height of this culminating point of the western world. The first attempt to ascertain the height of the mountain was made by Admiral Fitzroy in 1835, but to the present time the determinations of explorers have been contradictory, and it was not to be expected that a satisfactory determination would be reached without exact triangulation. Mr. Schrader decided to attempt triangulation in preference to the more unreliable hypsometrical estimates. He had the advantage of the levels of the Trans-Andean railway, which supplied a ready means of obtaining the height of the base from the ends of which he took vertical and horizontal angles. The mean of his measurements gives a height of 22,812 feet, which result is only 56 feet lower than the height given by P. Güssfeldt. As Schrader's observations were repeated and checked by various methods, the mean resulting height is probably the most accurate determination made to this date.

CARD CATALOGUE OF SOUTH AMERICANA.—In a paper read before the American Political Science Association on Dec. 28, 1907, Dr. Hiram Bingham of Yale University referred to the card catalogue of South Americana on which he has been engaged at intervals for seven years. It is now accessible for use in the Yale library, and, though far from complete, it contains about 25,000 cards and is continually growing. It has cards for the South American collections in the Harvard, Princeton, and Yale libraries and the library of Congress; also for many books not at present known to be available. Cards for books in the John Crerar and the Newberry libraries of Chicago and the Columbus Memorial library are about

to be added. It is hoped to make it a subject catalogue for all material relating to Spanish-American history, politics and geography, and, as far as possible, the index will give the whereabouts of at least one copy of each book. The most striking fact deduced from a study of this catalogue is the scarcity of trustworthy, comprehensive works in English and of scholarly monographs in any language.

THE NATIONAL CIVIC FEDERATION (*Executive Secretary,* Roland P. Falkner, 281 Fourth Avenue,) has undertaken to arrange for a visit of 500 or more selected American teachers to inspect the schools and colleges of Great Britain and Ireland. Of these 50 may visit the Continent, landing at Antwerp.

The trip must be made between September, 1908, and January, 1909, eastbound, and between November, 1908, and March 15, 1909, west-bound, in the second cabin of a steamer of one of the following lines:

White Star Line, New York to Southampton, or Liverpool;
Do. do. Boston to Liverpool.
American Line, New York to Southampton;
Do. do. Philadelphia to Liverpool.
Red Star Line, New York to Antwerp and Dover.
Dominion Line, Montreal to Liverpool.
Fare: Five Pounds for the round trip.

Nominations must be made by Boards of Education, Boards of Trustees, or other proper authorities, through whom applications must be transmitted on or before June 1, 1908, on a form which will be sent upon request.

TABLE OF HARBOUR DEPTHS.—The U. S. Coast and Geodetic Survey has issued the third edition of the "Table of Depths for Channels and Harbors" (*Bulletin* 36). It includes the United States, Porto Rico, and the Hawaiian and Philippine Islands. It is noted in the preface that in the Gulf of Mexico, west of Florida, the effect of the wind is far greater than that of the tide, the depth of water varying with the direction, intensity and duration of the wind. On our Pacific coast south of Canada we have only two ports, San Diego and San Francisco, that are secure from all winds and also readily accessible.

REPORT OF THE MISSISSIPPI RIVER COMMISSION.—Annual Report of the Chief of Engineers, 1907, Appendix ooo. II and 163 pages (pages 2605-2768). 1 plate. Government Printing Office, Washington, 1907.—This volume follows the plan of former reports of this Commission. The book is made less bulky than many which have preceded it by the omission of all but one plate. A concise statement of the work done during the year, and of the results of that work relative to protection from flood and navigability of channel, opens the report. This is followed by a statement of appropriations and allotments and four appendixes. Appendix 1 contains the report of the secretary of the Commission and is a detailed account of surveys, gauges, observations, dredges and dredging. The commercial statistics for the calendar year 1906 are included. Appendixes 2, 3 and 4 contain the reports of the engineers in charge of the First and Second, Third and Fourth Districts of the river. The stages of the Mississippi River were unusually high during the fiscal year (July, 1906-June, 1907). The low-water season was a short one, ending about November 17. During the season, a small amount of dredging was done in anticipation of a continuation of the falling stage of the river to the end of the year. Depths of 10 feet and over were found on all crossings throughout the year. The high-water season was marked by an early (January) and

dangerous rise of the river, which at Cairo was the highest recorded for that month and lacked 1.8 feet of the highest stage for the station. The flood was handled with comparative ease.

The reports are published without indexes. For the convenience of those who may desire to use some of the material of this report, the following partial index is added:

Appropriations and allotments.....2606, 2626.
Bank protection.....2611, 2755, 2729, 2732.
Channel work.....2611, 2676, 2701.
Commercial statistics.....2661.
Discharge observations.....2648.
Dredging .....2610, 2649, 2653.
Harbor improvements.....2611, 2735, 2741.
High water.....2625, 2691, 2715, 2755.
Hydrograph of river for the year.....opposite 2674.
Laws affecting Commission.....2674.
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protection .....2622.
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Natchez Harbor work.....2735.
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Surveys .....2609, 2620, 2646, 2693, 2707, 2748.
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R. M. B.

ASIA.

Dr. Sven Hedin's Latest Work.—News from Dr. Sven Hedin, reported by the Associated Press, is to the effect that he has recently visited Nepal and has, for the fifth time, crossed the gigantic mountain range, about 2,000 miles long, extending from the Salwin to the Panj River, collecting valuable details concerning it. He has discovered that the true source of the Brahmaputra is the Kubitsanpo, which rises from an enormous glacier on the northern side of the northernmost parallel range of the Himalayas. He has found that the Marium-chu, which has hitherto been regarded as the source, is merely a small tributary flowing in from the west.

He also made a careful study of the hydrographic problems relating to the Manasarowar and the Sutlej, and then made the circuit of the Kailas peaks, discovered the true source of the Indus, and travelled northeast to 32° N. Lat. At last accounts he was going to Ladakh and Khotan, *via* the road running east of the Karakoram Pass. In the spring he will travel either to Peking or to India.

Reclaiming a Part of the Salt Desert of Asia Minor.—About a third of the vilayet Konia, the largest province in Asiatic Turkey, is occupied by a salt desert, which was formerly a part of the sea floor. In the desert is the salt lake of Kotch-Hissar, area 300 square kilometers, all that remains of the former sea. The Turkish Government has given a concession to the Anatolian Railroad Company (German), to reclaim the southwestern part of this desert in the neighbourhood of the town of Konia by irrigation works, similar to the system used in Egypt. It is expected to reclaim about 150,000 acres by leading to the district

water from the large Bey-Schehir Lake among the mountains 120 miles to the west, and distributing the water over the land by hundreds of irrigation channels. It is estimated that the annual yield of wheat from this land will fill 20,000 freight cars, and that it may be sent conveniently to various divisions of the Turkish army as a part of their food supply. The new farm lands will add considerably to the freight business of the railroad and will thus reduce the liability of the Turkish Government, which guarantees that the receipts of the Anatolian Railroad and its extension to Bagdad shall not fall below 17,000 francs a kilometer per annum. (*Geog. Zeitsch.*, 1908, No. 1, p. 49.)

THE HEDJAZ RAILROAD.—The *Frankfurter Zeitung* says that the directors of the Hedjaz Railroad have made a provisional agreement with Dr. Blankenkorn, a German geologist, to study the basin of the Dead Sea for petroleum, and to investigate the mineral resources of the regions bordering on the railroad. The Board of Trade *Journal* (No. 585) says that in consequence of the opening of the Haifa-Damascus section of the Hedjaz Railroad, the town has become a prosperous place and three trains a week are now run from Haifa to Damascus and Ma'an (Petra), beyond which point only Mohammedans are allowed to travel.

COMMERCIAL HANDBOOK OF THE DUTCH EAST INDIES.—No. 2, Vol. 6, of the *Abhandlungen* of the Vienna Geographical Society, is a handsome volume of over 300 pp. entirely devoted to Dr. F. A. Schoeppel's "Kommerzielles Handbuch von Niederländisch-Indien," an economic study. The author describes the native and foreign population, the latter including 28,000 Arabs from Hadramaut, on the south coast of Arabia. The Arabs are not accompanied by women of their own race, but marry native women. The geology, geography, climate, flora, and fauna are sketched in their most salient features, but rather too briefly. The colonial policy and laws and regulations relating to property, business, colonial finance, the tariff, etc., are treated at length.

The trade in opium, edible birds' nests, salt and the pawnshops are government monopolies, which in 1905 yielded a profit of 11,897,000 florins. All the needs and opportunities of trade, agriculture, and manufacturing, the labour supply, etc., are discussed with a view of enlightening European capitalists who may wish to invest money in plantation or other colonial enterprises. Fine photographs showing chiefly superior specimens of native art works are a feature.

AUSTRALIA.

SURVEYS IN WESTERN AUSTRALIA.—The Geological Survey of Western Australia is pushing forward its examination of the various mining centres and issuing reports dealing with the geological features that bear upon economic questions. *Bulletin 28* describes mining centres in the East Murchison, North Coolgardie, and Mount Margaret gold fields whose rocks may be divided into an acidic and basic series, viz.: the granites and the greenstones. Economically the latter are the more important, as they form the matrixes of the paying auriferous reefs. The report is accompanied by two maps and five mining plans. The district reviewed returned, up to the end of 1906, 581,104 ounces of fine gold, of which 4,441 were derived from alluvial deposits.

The Department of Lands and Surveys is also rapidly carrying forward the work of surveying areas adapted for agriculture and town sites. The *Report* of

the Surveyor-General for 1907 says that during the fiscal year ending June 30, 4,149 rural blocks, containing 1,061,068 acres and 2,417 town lots, were surveyed and about 2,650,200 acres were classified.

THE AUSTRALIAN TRANSCONTINENTAL RAILROAD.—The two legislative chambers of the Commonwealth of Australia have voted favourably upon the project to complete the transcontinental railroad between Adelaide, the capital of South Australia, and Port Darwin, on the north coast. The portions of the line already in operation extend in the south from Adelaide to Oodnadotta (675 miles) and in the north from Port Darwin to the mining district of Pine Creek (198 miles). The line to be built between these points will be 1,240 miles in length. The project originated in 1872. The company formed to build the road demanded a concession of about 2,000,000 acres along the route. This condition was not accepted, nor was the later proposal to carry out the project for a consideration, including a concession of 1,000,000 acres. The importance of completing the railroad, both as a convenient route for Australasian commerce with the Orient and also for the development of the North West Territory of South Australia, whose mining and agricultural resources are found to be large, has long been emphasized by the Australian press.

EUROPE.

THE SHANNON RIVER.—Mr. J. R. Kilroe, of the Geological Survey of Ireland, has written a paper on the present course and geological history of this river, printed in the *Proceedings* of the Royal Irish Academy (Vol. 26, Section B, No. 8). He reaches the conclusion that a post-Eocene plain of denudation probably existed in this region some 2,500 feet above the present limestone plain, and it was upon this ancient plain that the Shannon originally began to flow. At the present rate of surface waste, the lowering of the surface to the present level may have occupied 15,000,000 to 30,000,000 years.—This period, however, may have been greatly shortened by glacial erosion of the surface. The gouging action of the glacier is apparently the only thing that can account for the present form of the Shannon bed above Killaloe. Prior to the glacial period the river was probably forced to abandon the Killaloe gorge for a time, and flowed along the Scarriff Valley towards its estuary. Upon the melting of the glacier the bottom of the gorge had become so modified that the river could resume its course there and southward as far as O'Briensbridge, though thereafter it became deflected from its original course by morainal accumulations.

GUIDES TO SWEDEN.—The BULLETIN has heretofore mentioned the excellent series of guide books issued by the Swedish Touring Club of Stockholm. The latest to appear is a revised edition of the volume "Sweden," published in English and other languages. It has large-scale coloured maps and is filled with condensed and well-arranged information concerning the tourist routes in the kingdom. An especially interesting section is devoted to Lapland, describing the tour on the Arctic railroad from Boden to Narvik, the ice-free port on the Atlantic, and the various trips for pedestrians and canoe men among the fine highlands.

POLAR.

MR. STEFANSSON'S INVESTIGATIONS AMONG THE ESKIMOS.—Mr. V. Stefansson, who returned last fall from the Mackenzie River delta, after living a year with

the Eskimos of that region, will start again for the north coast of the continent, late in April, for the purpose of renewing his studies among one or more Eskimo groups of whom very little is known. After reaching Herschel Island, early in August, he expects, if the ice conditions permit, to be taken east as far as the Baillie Islands, Cape Bathurst, on the whaler *Narwhal,* Captain Leavitt, commander. From this point he will endeavour to make his way eastward for the purpose of spending next winter either with the Eskimos of the Duke of York Archipelago in Coronation Gulf, or, if it seem best, he will endeavour to reach the natives of Victoria Land, further north.

Mr. Hanbury, during his travels in northern Canada, met one family of the Coronation Gulf natives while they were hunting south of the mainland coast near Dismal Lake. With this exception, it is believed that no white man has come into contact with this group of natives. Collinson and M'Clure, over fifty years ago, barely met a number of the Eskimos of Victoria Land, and Captain Klinkenberg, in the whaler *Olga,* spent the winter of 1905-6 in Prince Albert Sound, west coast of Victoria Land, where he met two groups of the natives, who told him that in the interior of the island were two other groups. These facts indicate that the regions of Coronation Gulf and Victoria Land afford very favourable opportunities for ethnological study among groups of natives practically unknown to the white race.

If the travel conditions prevent Mr. Stefansson from reaching these eastward natives, his plan is to go further west to the mouth of the Colville River which he will ascend to the region occupied by the Nunatama or inland Eskimos, 200 or 300 in number, probably more than half of whom have never seen a white man, and who seem to be the least known scientifically among all the Eskimos of Alaska.

Mr. Stefansson expects to be gone about a year and a half on this expedition. The American Museum of Natural History has chiefly contributed to make the work possible. He will reach the Arctic overland, *via* the Mackenzie River, taking part of his supplies with him while the remainder will be carried north in the whaler.

Mr. Leffingwell is spending the Arctic winter in the camp at Flaxman Island, well supplied with everything needed. He is working up his summer notes and surveys,,and will go on for another year, mapping. that coast region, and making geological surveys of a range of mountains inland. Mate Storkersen, who made the sledge journey with the leaders last year, will return this spring, and remain with Mr. Leffingwell for a year and a half. Supplies for them and for some Eskimo families will be forwarded by the courtesy of Captain Henderson, Revenue Cutter *Thetis,* who will take the goods as far as Point Barrow, where they will be transferred to a whaling vessel and taken on to Flaxman Island. In case a landing cannot be made there, the provisions will be taken to Herschel Island.

There is difficulty in landing anything at Flaxman. The camp will have to be abandoned if provisions cannot be placed there before the winter sets in. The Eskimos in that region are very poorly supplied, and will suffer severely if they lose the aid of the explorers. Letters and packages forwarded to Captain Henderson, U. S. R. C. S., will be taken by his vessel to Point Barrow, and forwarded by a whaling vessel from that point. Mr. Leffingwell intends to return October, 1909.

The *Thetis* sails from Port Townsend, Washington, about May 1st.

UNDERGROUND ICE-SHEETS OF THE ARCTIC TUNDRA.—Mr. Leffingwell's article on Flaxman Island* may be considered the first of the geological contributions of the Anglo-American Polar Expedition, of which he is one of the joint commanders. Essentially the article is a consideration of the underground ice-sheets which are such a well-known (though variously explained) feature of the Arctic tundra. The conclusion reached is that in the case of Flaxman Island the ice-sheet underlying the surface soil of most, if not all, of the island is of glacial origin. This conclusion is based upon two facts: (a) that "when the ice is closely examined it is seen to be full of minute air bubbles and to be coarsely granulated; which shows it could not have been formed by the freezing of a body of standing water," and (b) the fact that both in the soil above the ice and imbedded in the ice itself are small boulders showing glacial striation. The mountains to the south (twenty to forty miles away) are pointed out as a convenient source for the glacier, though (quoting Schrader†) the tops of the mountains do not show signs of having been overridden by a moving ice-sheet. The argument is that, nevertheless, the northward slopes and valleys may have been breeding places for glaciers.

It may be that neither time nor other circumstances change ice formed from standing water to a "coarse granular structure" nor make it "full of minute air bubbles," and if that be the case, the glacial origin of the sub-surface ice-sheet of Flaxman Island is, doubtless, established, as against Schrader's theory‡ that "the ground ice is the result of 'frozen bays, lagoons, lakelets, or perhaps other coastal bodies of ponded water now raised into low anticlines and cut back by wave action.'" But there still remains the theory advanced by the Canadian geologist Mr. J. B. Tyrrell,§ that the ice-sheets he has observed on the tundra west of Hudson's Bay and on the hill-slopes and in the valleys of the Yukon gold country were formed and are now being formed by the rising of underground water through fissures in the frost layer (from 50 to 200 ft. thick in the mining country) and its freezing into sheets two to four feet below the surface of the ground and approximately parallel with the surface. Mr. Tyrrell's arguments are based on extensive observation both in mountainous country and on plains remote from mountains. Whether ice formed along "planes of weakness parallel to the surface" (when the rising water finds itself unable to penetrate the water-soaked and adamant frozen surface layers of ground) would be of a structure similar to that observed at Flaxman Island, is apparently the crucial question. Otherwise, Mr. Tyrrell's theory (to which Mr. Leffingwell makes no reference in his article and with which he may be unfamiliar) would seem to form as plausible an explanation of the Flaxman Island ice-sheet as does the glacial one. A further consideration is that my own observations on the ice at Flaxman do not agree with Mr. Leffingwell's in this: he records (p. 57) that "Nowhere is the base of the ice exposed, so no estimate of its thickness can be made"; while I have (at a different season of the year) seen the base exposed, showing an unmeasured thickness of not over four feet. This thickness agrees very well with that of the sheets observed by Mr. Tyrrell, both in the Yukon

* Flaxman Island, a Glacial Remnant, by Ernest De Koven Leffingwell. The Journal of Geology, vol. XVI, pp. 56–63. The article is dated at Flaxman Island, October 15, 1906.

† Schrader, F. C., Professional Papers, No. 20. U. S. Geological Survey.

‡ Op. cit., p. 96.

§ Tyrrell, J. B., Chrystosphenes or Buried Sheets of Ice in the Tundra of North America. Journal of Geology, vol. XII, pp. 232–236.

and near Hudson's Bay, and which he describes as ranging in thickness from a few inches to four feet. I have also seen outcrops of ice along the beach east of the mouth of the Colville River, and at that point mountains, which could have been sources of glaciers, are very much farther from the coast than they are at Flaxman Island, a hundred miles farther east. So far as I could see, this ice was of exactly the same character as that which I had seen at Flaxman, and showed on melting about the same residuum of sand particles, rock fragments, etc., as does the ice studied by Mr. Leffingwell on the island. Seeing that the extensive but thin sheets of ice observed by Mr. Tyrrell* on the Barren Grounds are hardly open to explanation by a glacial hypothesis (the fact that mountains are hundreds of miles away is only one of the many difficulties in the way of such a theory), is it not likely that not only the ice deposits at Cape Halkett and the Colville mouth but also those at Flaxman may have another than a glacial origin? Mr. Leffingwell's own more extended observations in the north the summer (1907) following the writing of his present article may serve to throw more light on the subject. V. S.

VARIOUS.

A General Committee on Geological Nomenclature.—The Bulletin referred in the February number (p. 104) to the resolution of the Mississippi Valley Association of State Geologists expressing its belief "in the desirability of a thorough reconsideration of the principles which should govern the nomenclature of geology." The Geological Society of America at its meeting in December, acting upon this initiative, recommended to the organizations concerned that a general committee on geological nomenclature be formed, one-fifth of its members to be chosen from the U. S. Geological Survey, and one-fifth each from the State geological organizations, the Canadian Geological Survey, Mexico, and from geologists at large selected by the Geological Society of America; this general committee to have authority to appoint special committees on nomenclature for the investigation of the particular questions referred to them; the special committees to report their conclusions to the general committee; and the fact that any subject is under discussion by the general committee to be made known to the scientific public. The purpose of the recommendations is to provide a source from which any geologist may on application obtain advice regarding nomenclature.

The Spelling of Place Names.—At the instance of Prof. Ricchieri of the Accademia Scientifico-Letteraria, Milan, the reader of a paper on this subject at the Sixth International Geographical Congress, held at London in 1895, the organizing committee of the Ninth International Geographical Congress, which is to meet at Geneva between the 27th July and the 6th August this year, has placed on the list of agenda of the Congress the following question:

What are the principal difficulties in the way of arriving at an international agreement on the transcription and orthography of geographical names and in what manner can they be surmounted?

Prof. Ricchieri, believing that if this problem is to be solved at all it can only be by slow stages and methodical procedure, proposes that all that should be aimed at in the first instance should be a preliminary agreement, among a few men of different nationalities interested in this question, as to the fundamental points on

* Op. cit., p. 234.

which it is necessary that a final agreement should, if possible, be reached, and that a statement of those points should be laid before the Congress at Geneva, which should then be asked to appoint a small committee to study and procure the discussion of those points, and ultimately to draw up proposals and resolutions thereon. He further suggests that this committee should be expected to publish its proposals at least one year before the meeting of the next International Congress, which, it is hoped, might then be in a position to draw up final resolutions on the subject. This scheme of operations has received the support of Prof. Henri Cordier of the École spéciale des langues orientales, Paris; Prof. Robert Sieger of the University of Graz; and of Mr. G. G. Chisholm, Recognized Teacher of the University of London (Birkbeck College), who have agreed to co-operate with Prof. Ricchieri in drawing up the preliminary statement of fundamental points requiring solution to be laid before the Geneva Congress. Mr. Chisholm will be glad to forward to Prof. Ricchieri any suggestions on this question sent to him at his private address (59 Drakefield Road, Upper Tooting, London, S. W.)

The Cartographic Monthly Report.—A new department of *Petermanns Mitteilungen,* which will appear in every issue, was introduced in the January number. It will be known as the *Kartographischer Monatsbericht.* Its editor is Dr. Hermann Haack, a member of the staff in the Perthes establishment at Gotha and widely known as the editor of the *Geographen-Kalender* and author of reports on the progress of cartographic science in the *Geographisches Jahrbuch.* The *Monatsbericht* will also be issued as a separate, at 6 marks a year.

The new department should be a welcome addition to the facilities of working geographers and map houses. The first report includes 92 titles of new maps. A number of them are mother maps. In the arrangement, atlases come first, then maps of the world, then the continents with their countries, dependencies, or divisions, and the polar regions. In each section the maps are arranged alphabetically, as far as possible, under the names of authors. After the author come the title, scale, coordinates, showing area embraced; size, measured from inner margin; publisher, or periodical in which the map appears, title of the letterpress which the map illustrates, if any, and place and year of publication. Each map has numerals indicating the volume in which it appears and its place in the series of notices. A few words of comment are occasionally inserted.

The quality entitling a map to notice is new or helpful data; possessing this quality a map is included, whether an elaborate product or merely a sketch map.

Many of the maps are such as have not commonly been noticed in lists of new maps, perhaps because, appearing chiefly in geological publications, some of them are not widely distributed in geographical libraries.

The price of the maps is given when possible. Many good maps illustrating books are in the list. A sketch map of an Arctic sledge journey is credited to one periodical, while the same map on a larger scale in another publication is not mentioned. It might be more convenient for the student to obtain the latter map, and its existence should at least be noted.

The *Monatsbericht* will supply a real need if its review of the cartographic field shall be comprehensive as far as authoritative and mother maps are concerned; and if its contents are so indexed that cartographers and geographers may easily find in the coming volumes the latest and most authoritative cartographic expression of facts. Such a publication will tend towards the improvement of the average quality of the map product.

VOLCANO AND EARTHQUAKE OBSERVATORIES.—The Geological Society of America, at its recent general meeting, recommended to the several North American Governments and to private enterprise the establishment of volcano and earthquake observatories for the purpose of making permanent records of the physical phenomena accompanying earthquakes and eruptions, both before and after the events. Such records have a direct bearing on the possibility of predicting these occurrences and on the protection of life and property. The North American Governments have in their territories a wide field for the investigation of active volcano and earth movements.

DR. ROBERT KOCH, the German bacteriologist, who has returned from his investigation of sleeping sickness in German East Africa, will visit America this spring. *Science* says that he will rest for a year from his scientific work, and has therefore refused to accept invitations to lecture in the United States. He discovered in Africa that a preparation of arsenic brought to a standstill the progress of sleeping sickness in the human system. He also believes that he has sufficient evidence for declaring that the poisonous infusoria which are the cause of the disease are imbibed from the crocodile by the tsetse fly and introduced by its bite into the blood.

DR. L. A. BAUER, Director of the Department of Terrestrial Magnetism of the Carnegie Institution, lectured at Columbia University on Feb. 11 on "The Magnetic Survey of the Pacific Ocean."

THE "Statistique Annuelle de Géographie Comparée," for 1907, by Prof. Jean Birot (Hachette & Co., Paris), maintains its reputation as a well-arranged statistical handbook in which many kinds of facts for the various countries are grouped for purposes of comparison. In the paragraph relating to maize, for example, the production of the eight countries leading in this culture is given with a statement of the production of the United States (which supplies five-sixths of the World's crop) for ten consecutive years. The exportations of the six largest exporting countries are given. The comparative idea is kept in view throughout and the tables are very convenient and suggestive.

THE AMERICAN GEOGRAPHICAL SOCIETY.—A Regular Meeting of the Society was held at Mendelssohn Hall, No. 119 West Fortieth Street, Tuesday, February 25, 1908, at 8.30 o'clock, P. M., Mr. Levi Holbrook in the chair.

The following persons, recommended by the Council, were elected to Fellowship:

Robert L. Loughran. F. Stokes Berlin.

The Chairman then introduced Mr. John Barrett, who addressed the Society on his journey Along Untravelled Routes of the Andean Cordilleras in Colombia and Ecuador. Stereopticon views were shown.

On motion, the Society adjourned.

OBITUARY.

PIERRE-JULES-CESAR JANSSEN.—This distinguished savant died in December at the age of 83. He was formerly President of the Paris Geographical Society and won distinction in the fields of astronomy and geography. He was director of l'Observatoire d'astronomie physique de Meudon, and was especially well known for the observatory which he was the means of establishing on the

summit of Mont Blanc. Prof. de Lapparent delivered a eulogy in the name of the Paris Geographical Society at the funeral of the deceased scientist.

Lieut.-General SIR RICHARD STRACHEY, R.E.—This eminent man of science died on February 12 at the age of over ninety years. He was elected a Fellow of the Royal Society in 1854 for work in botany, geology, and physical geography in the Kumaon Himalayas, and he was the first to treat scientifically of the physical and botanical geography, geology, and meteorology of the western Himalaya and of Tibet. As an officer of the Royal Engineers he had a long and distinguished career in India. He was Chairman of the Meteorological Council, 1883-1905, and served as President of the Royal Geographical Society, 1888-1890.

NEW MAPS.

AFRICA.

CONGO FREE STATE.—Le chemin de fer du Haut-Lualaba. Scale, 1:2,000,000, or 31.56 statute miles to an inch. *Le Mouvement Géographique,* Vol. 25, No. 4, Brussels, 1908.

A sketch map showing the railroad now being built from Kindu to Buli around the rapids and falls in the upper Lualaba, the head stream of the Congo.

CONGO FREE STATE.—Wasserstrassen und Eisenbahnen im freien Kongostaat. Scale, 1:12,000,000, or 189.4 statute miles to an inch. By Prof. Dr. Adrien de Ghellinck. *Geog. Zeitschrift,* Vol. 14, No. 2, Leipzig, 1908.

Illustrates a paper by Dr. Ghellinck on navigation and railroads in the Congo Free State. The navigable parts of the Congo and its tributaries are shown in heavy black. Railroads in operation, construction, or projected, and telegraph lines are indicated. A few heights along the main river are given in meters.

CONGO FREE STATE.—Carte du District du Kasai. Scale, 1:1,000,000, or 15.8 statute miles to an inch. Department of the Interior, Congo Free State, Brussels, 1907.

The nomenclature is unusually full. Boundaries of the State, the District, and its sub-divisions, itineraries, chief towns and State stations are in red, black symbols distinguish commercial posts, villages, missions, and tribes, blue is used for hydrography and brown for hill features.

CONGO FREE STATE.—Carte Foncière de l'État Indépendant du Congo. Scale, 1:8,000,000, or 126.2 statute miles to an inch. Fifth edition. *Le Mouvement Géographique,* No. 5, Brussels, 1908.

Shows the national domain and private lands in red and the crown lands and land concessions in blue tints. The lands held under concessions by commercial companies are distinguished by numerals.

SOUTH AFRICA.—Bartholomew's Reduced Survey Map of South Africa. Scale, 1:2,500,000, or 39.4 statute miles to an inch. John Bartholomew & Co., Edinburgh, 1907. (Price, 2s.)

A new and revised edition of this fine tourist map, which is a generalization of our knowledge of South Africa south of the 22nd parallel. Five tints are

used to show contours of altitude from sea-level to above 4,000 feet. Main roads, other roads, railroads in operation or construction, steamship routes, with distances in nautical miles and a large nomenclature are features of the map. Insets of Cape Town, Port Elizabeth, and Durban are given on a scale of 1:42,240, or 0.6 statute mile to an inch, large enough to show the street plans.

AMERICA.

U. S. Geological Survey Maps.

United States.—Geologic and Economic Map and Sections of the Arkansas Coal Field. Scale, 1:316,800, or 5 statute miles to an inch. *Bull.* No. 326, U. S. Geol. Survey, Washington, 1907.

Illustrates a paper by Arthur J. Collier on the Arkansas Coal Field, with reports on the palæontology by David White and G. H. Girty. Both the carboniferous and the tertiary rocks contain extensive deposits of coal but only those of the carboniferous, in the valley of the Arkansas River and adjacent to the western border of the State, are yet known to the trade. This is the area embraced in the map.

U. S. Hydrographic Office Charts.

Pilot Chart of the North Pacific Ocean, March, 1908.

Pilot Chart of the North Atlantic Ocean, February, 1908.

United States.—Geological Survey of New Jersey. Atlas sheet No. 38. Scale, 1:316,800, or 5 statute miles to an inch. H. B. Kümmel, State Geologist, Trenton, 1907.

This is the political and railroad map of the State, showing all municipalities with township and borough boundaries, and railroads, as revised in 1906.

New Jersey.—Geological Survey of New Jersey. Atlas sheets Nos. 25, 35, 36. Scale, 1:63,360, or 1 statute mile to an inch. Henry B. Kümmel, State Geologist, Trenton, 1908.

Cultural features, as revised in 1907, appear on these sheets.

United States.—Sketch Map of the Adirondack Region Showing Iron Ore Deposits. By David Hale Newland. Embraces about 11,000 square miles between Lakes Champlain and Ontario and the St. Lawrence and Mohawk Rivers. *Economic Geology*, Vol. 2, No. 8, Lancaster, Pa., 1907.

Illustrates a paper by Mr. Newland, "On the Associations and Origin of the Nontitaniferous Magnetites in the Adirondack Region." Symbols show the geological formations and the hematite and magnetite deposits.

United States.—Geological Map of Long Lake Quadrangle. Scale, 1:62,500, or 0.9 statute mile to an inch. Geology by H. P. Cushing, New York State Education Department, Albany, 1907.

Illustrates the monograph "Geology of the Long Lake Quadrangle," published as Bulletin 413 of the N. Y. State Education Department. The area mapped comprises the Adirondack region between parallels 44° and 44° 15′ N. Lat., and meridians 74° 15′ and 74° 30′ W. Long. Many of the lakes in this area with low shores of morainic material or sand are being rapidly converted into marshes, as the map shows.

UNITED STATES.—Geologic Map of the Rochester and Ontario Beach Quadrangles, New York. Scale, 1:62,500, or 0.9 statute mile to an inch. Geology by C. A. Hartnagel. Area, 43°-43° 20′ N. Lat. and 77° 30′-77° 45′ W. Long. Bulletin 409, N. Y. State Educational Department Albany, 1907.

The *Bull.* gives 35 pp. of letterpress descriptive of the map. The City of Rochester is situated nearly in the centre of the map.

SURINAM.—Schetskaart van het Grensgebied Suriname-Brazilië. Scale, 1:1,000,000, or 15.78 statute miles to an inch. By Lieut. C. H. de Goeje. *Tijdschrift* of the Royal Netherlands Geographical Society. Third Series, Vol. 25, No. 1, Amsterdam, 1908.

Illustrates a paper on the work of the fifth Dutch expedition sent to this boundary region in 1907. The boundary, paths, savannas, villages, drainage, and Indian tribes are shown. Mountain heights are given in meters. An inset sketch map of Surinam on a scale of 1:4,000,000 gives a clear idea of the main features of our present knowledge of Dutch Guiana. The extent of the still unexplored region in the southwestern part of the colony is indicated.

CHILE.—República de Chile. No scale given. By Dr. H. Steffen. Imprenta Cervantes, Santiago, 1907.

The map illustrates the admirable paper by Dr. H. Steffen "Contribuciones para un Estudio Científico del Terremoto del 16 de Agosto de 1906" published in *Los Anales* of the University in May and June, 1907, and now issued as a separate. Black lines show the approximate course of the lines of equal seismic force. Other symbols show the chief directions of the horizontal oscillations, limits of the zone of vertical movements, areas in which there were movements with intervals of calm, etc.

PERU-BRAZIL.—Plano del Rio Amazonas desde Iquitos hasta Manaos. Scale, 1:500,000, or 7.8 statute miles to an inch. By Carlos E. C. Hoempler, Iquitos, 1906.

The map is distributed with the *Boletin* of the Geographical Society of Lima (Vol. 21, No. 1). It is a chart of the course of the Amazon between Iquitos and Manaos on a scale so large that the accepted steamer route, whether near one shore or the other or winding about among the islands, is clearly given. The chart is based upon the experience of the captains of the ocean steamers owned by Booth & Company and plying between Liverpool and Iquitos.

PANAMA.—Contour Map and Profile of the Panama Canal from Chagres River, K. 45, to Pedro Miguel, K. 60. *Journal* of the Western Society of Engineers, No. 6, Chicago, 1907.

Illustrates a paper by A. S. Zinn on the Culebra Cut. Land forms are shown by contours. The profile gives a clear idea of the original height of the surface, of the amount of excavation yet to be done, and the nature of the rocks in which the excavation will be carried out. A cross section shows the proposed widening of the cut by the Americans.

ASIA.

KOREA.—General Geological Map of Korea. Scale, 1:1,500,000, or 23.67 statute miles to an inch. *Journal of Geography*, Tokio Geographical Society, Vol. 19, Tokio, 1907.

This map is the result of work done by Japanese geologists who have been

studying the geology and mineral resources of Korea. The map and the article it illustrates are by Mr. Kinosuke Inoue. It is a noteworthy addition to the mapping of Korea. Thirteen tints are used to show the distribution of the geological formations and ten symbols show the locations of the leading mineral deposits. Heights are in meters.

EUROPE.

GERMANY.—Regenkarte von Deutschland auf Grund zehnjährigen Beobachtungen (1893-1902) von 3,000 Stationen. Scale, 1:1,800,000, or 28.4 statute miles to an inch. Von G. Hellmann. Dietrich Reimer (Ernst Vohsen). Berlin, 1906. (Price, M. 3.)

Twelve tints very clearly express the distribution over Germany of the mean annual precipitation. The map is accompanied by a page of explanatory text. The colours show graphically the rapid decrease in quantity of rainfall from west to east and the large influence of elevations above sea level upon the amount of rainfall, so that a good rain map of Germany may be regarded, to a certain extent, as showing contours of elevation above the sea.

SWEDEN.—Karta öfver Sveriges Flottleder. Scale, 1:2,000,000, or 31.56 statute miles to an inch. By Gunnar Andersson. *Ymer,* No. 4, Stockholm, 1907.

Shows in red the public and the private waterways used for floating timber, with other information concerning the timber industry in relation to streams.

GENERAL.

EASTERN HEMISPHERE.—Kürzeste Verbindung zwischen Europa, Indien, und Australien. Mercator projection. *Abhandlungen* der K. K. Geog. Gesellschaft in Wien, Vol. 6, No. 2, Vienna, 1907.

The map illustrates Dr. Schoeppel's "Kommerzielle Handbuch von Niederländisch-Indien." It shows that when the Anatolian Railroad to Bagdad, the Sumatra Railroad, and the Trans-Australian Railroad are completed, the shortest land and water route from Paris to the Dutch East Indies and Australia will pass through Constantinople, Bagdad, Bombay, Madras, Sumatra, Java, and Palmerston and Adelaide, Australia.

DUTCH EAST INDIES.—Karte der Schiffahrt-Verbindungen in Niederländisch-Indien. No scale given. By Dr. F. A. Schoeppel. *Abhandlungen* der K. K. Geog. Gesellsch. in Wien, Vol. 6, No. 2, Vienna, 1907.

Shows all the shipping lines and their routes among the islands of the Dutch East Indies and the frequency of their service.

WORLD.—Die Ausbreitung der Rüsseltiere nach Dr. Th. Arldt. Mercator projection. *Gaea,* No. 2, Leipzig, 1908.

Shows the present and the past distribution of the various known species of the elephant family. Illustrates "Die Heimat der Elefanten" by Dr. Arldt.

BOOK NOTICES.

Elementare Theorie der Entstehung der Gezeiten. Von Aloys Müller. 86 pp., and 28 Figures. Verlag von Johann Ambrosius Barth, Leipzig, 1906. (Price, M. 2.40.)

The monograph was suggested by the German edition of Prof. G. H. Darwin's "The Tides and Kindred Phenomena in the Solar System." It presupposes that the student is well grounded in mathematics and physics, gives further development to the theories discussed by Prof. Darwin, treats mathematically the physical problems involved and controverts the theories prevalent in German text books as to the origin of tides. The work is to be commended to teachers of physics.

Boulder Reveries. By W. S. Blatchley. 230 pp., Illustrations from Photographs and Index. The Nature Publishing Co., Indianapolis, 1906 (Price, $1.10.)

The work of a naturalist who is also State Geologist of Indiana. The book is the outcome of days of leisure spent chiefly in a wooded pasture lot well fitted for acquiring intimate acquaintance with the life, the hues and sounds of nature, with special reference to processes of vegetable growth and with all that flies, walks or crawls in the quiet corner thus observed and studied. The book is well written, is in thorough touch and sympathy with every aspect studied and is calculated to edify and entertain lovers of natural history.

Die Leitfossilien aus dem Pflanzen-und Tierreich in Systematischer Anordnung. Von Dr. Johannes Felix. x and 240 pp., 626 Illustrations, and Index. Veit & Co , Leipzig, 1906. (Price, M. 6.)

The subject of fossils is systematically presented with hundreds of illustrations. The work is especially designed for students in the higher schools, teachers of natural science, and geographers and travellers who may be helped by these brief descriptions and pictures of plant and animal life to recognize those forms which are most important in the study of geology.

The Later Cave-Men. By Katharine Elizabeth Dopp. 197 pp, numerous Illustrations. Rand, McNally & Co., Chicago, 1906. (Price, 45 cents.)

This is the third volume of Dr. Dopp's educational series. It deals with the age of the chase, gives very simply a generalized view of the early progress of the human race, and is designed for the intermediate school grades.

Der Kompass an Bord. Handbuch für Schiffsführer und Schiffsoffiziere. Herausgegeben von der Deutschen Seewarte. viii and 171 pp., Illustrations, and Appendix. L. Friederichsen & Co., Hamburg. 1906. (Price, M. 3.)

This is the second edition of the handbook issued by the German Hydrographic Office for the guidance of mariners in the use of the compass and for the correction of errors due to iron and steel in a vessel and to other influences.

Völkerkunde. Von Dr. Michael Haberlandt. Second edition. 203 pp. 51 Illustrations, and Index. G. J. Göschen'sche Verlagshandlung. Leipzig, 1906. (Price, 80 pf.)

One of the admirable books in the Sammlung Göschen. The treatment of ethnology in this small volume is necessarily concise, but it is well worth a place in the libraries of all teachers and students as an example of method in presenting the subject and an epitome of the leading features of it. The book shows that an adequate conception of the principles of ethnology and their application to the study of the families of men may be gained even from a small book like this one. Half of the book is given to the general consideration of Ethnology and the other half to the larger groups of the primitive and cultured peoples of the continental and oceanic lands. A list of 82 helpful works, chiefly German, is printed.

Le Maroc Pittoresque. Par Jean du Taillis. viii and 360 pp., 115 Illustrations. Ernest Flammarion, Paris, 1905. (Price, 10 fr.)

The purpose of this book is to familiarize the reader with many aspects of Morocco, which, on the whole, is still one of the least known parts of Africa. The author has made a number of journeys in that country and on his last visit spent eight months there. He travelled to Fez with the French Legation, penetrated eastern Morocco for the purpose of visiting the pretender to the throne, and travelled along the northern coasts and among the Rif Mountains. He took photographs giving many glimpses of Morocco and its life, and had a curious interview with the Sultan, of whom he presents a photograph. On the whole, he accomplishes admirably his desire to give a clear impression of the parts of Morocco which he visited.

A Tour of Four Great Rivers, the Hudson, Mohawk, Susquehanna and Delaware, in 1769. Being the Journal of Richard Smith of Burlington, New Jersey. Edited, with a Short History of the Pioneer Settlements, by Francis W. Halsey. lxxiii and 102 pp., Illustrations, Maps, and Index. Charles Scribner's Sons, New York, 1906.

Richard Smith made the tour of these four rivers for the purpose of surveying a grant of land comprising 69,000 acres on the upper Susquehanna in which he, with many others, was interested as proprietor. His journal is well worth preserving, because he observed real things with precision and recorded what was vital and interesting. He saw these valleys when the Indians still traversed the trails, and his journal is a faithful picture of the country, its native inhabitants, and its European settlers as seen by a man of acuteness and cultivation. Mr. Halsey has edited the journal with great care, and his chapter on the pioneer European settlements in these valleys is useful and interesting. The map shows Smith's route in red, the place names mentioned in the text, and also the modern county lines.

The Gambia Colony and Protectorate. By Francis Bisset Archer. xviii and 364 pp., 4 Maps, and 44 Illustrations. St. Bride's Press, Ltd., London, 1906.

Mr. Archer is the treasurer of the Gambia Colony. His handbook (official) contains the fullest and most authoritative information we possess on the smallest and least known of the British colonies of Africa. The Colony and Protectorate

are only about 20 miles wide, and midway between their northern and southern limits flows the Gambia. Its basin was one of the hot beds of the slave export trade, and Mr. Archer says the evils of that time are still apparent in the small population, which is very industrious, but inadequate for the great task of bringing about any rapid development of this exceptionally rich river tract. Half of the book is a history of the discovery and development of Gambia to the present time. Then come detailed descriptions of the five districts into which the colony is divided, chapters on the government *régime,* including education, the hospital service, and other humanitarian work, an English-Mandingo dictionary of about 800 words and phrases, and other information. The four maps include a plan of Bathurst, the capital and seaport, and a map of the Colony and Protectorate reproduced from sheet 47 of the map of Africa compiled in the Topographical Section, General Staff, War Office, London.

The Viscous vs. the Granular Theory of Glacial Motion. By Oswin W. Wilcox. 23 pp. Published by the Author, Long Branch, N. J., 1906. (Price, 30 cents.)

This is an argument against the viscous theory of glacial motion, which is based on the assumption that crystalline character is incompatible with viscous fluidity. The author maintains that this argument is without force in view of the existence of crystalline liquids. He gives facts and deductions to show that the advocates of the granular theory of glacial motion have ignored the relation between the rates of accumulation and disbursal of free energy within a glacier, and that, if the conditions postulated by the advocates of the granular theory actually prevailed in nature, the forward advance of a glacier would be incredibly limited.

Cook's Handbook for Egypt and the Sudan. By E. A. Wallis Budge. Second Edition. xx and 911 pp., 9 Maps (1 in Pocket), numerous Illustrations, and Index. Thomas Cook & Sons, London and New York, 1906. (Price, $3.25.)

This edition suggests that scarcely any part of the world is changing more rapidly in some aspects than Egypt and the Anglo-Egyptian Sudan. The progress of archæological research has helped to swell the volume to 911 pp. The extension of irrigation facilities, the places and monuments now more easily accessible to tourists, and development in the Sudan with tourist travel extending up the Nile by steamer to within five degrees of the equator, have also helped to enlarge the volume. The book is replete with information of all kinds, from the history and antiquities of Egypt to the British financial policy. Mr. Budge, the author, is the Keeper of the Egyptian and Syrian antiquities in the British Museum and is thoroughly competent for the preparation of such a work.

La Carrière d'un Navigateur. Par Albert Ier Prince de Monaco. Second Edition. viii and 406 pp., 2 Maps. Monaco, 1905.

All who read this book will feel better acquainted with the Prince of Monaco. His scientific work has shown much of the man as an indefatigable student of the sea. This book not only informs us more fully of his scientific vocation and of the temperament and aspirations that gradually led him into it, but we also learn much of his views, his philosophic notions, and his conviction that life is too serious to be spent in frivolity, a thought that was at the basis of his determination to be a sailor and an oceanographer. A philosophical vein

prevades all the chapters. The book is by no means a record of life work on the sea, but rather a description of selected incidents in a career, accompanied by interesting information and reflections. The titles of the eight chapters are: L'Ame du Marin, Mes débuts, Mon premier équipage, Un Cyclone, À la Chasse, Le dernier Voyage scientifique de l'Hirondelle, La Mort d'un Cachalot, Croisière dans les régions arctiques.

Das Weib, in Anthropologischer Betrachtung. Von Dr. Oskar Schultze. 64 pp and 11 Illustrations. A. Stuber's Verlag (C. Kabitzsch), Würzburg, 1906. (Price, M. 2.20.)

Dr. Schultze is Professor of Anatomy in the University of Würzburg. The book contains three lectures which he delivered in the University. They are a physical study of woman, the investigation including throughout a comparison of the physical characteristics of both sexes.

Reise nach Panama, Peru, Chile mit Feuerland, Argentinien, Paraguay, Uruguay und Brasilien. Von Richard Freiherr von und zu Eisenstein. 380 pp., 310 Illustrations, 7 Maps, 3 Plans, 10 Meteorological Tables and a Route Map. Kommissionsverlag von Karl Gerolds Sohn, Vienna, 1906.

The author made a tour around the world with a more serious purpose in view than that of the ordinary tourist. His journey was a leisurely one, and he collected a large amount of data relating to the trade policies and the cultural, political, social, and industrial conditions of the various nations. He was also interested in the more striking phenomena of nature and the most conspicuous human achievements. His book is filled with facts and handsomely illustrated by numerous photographs. It is the latest of the series in which he describes his world journey.

Landeskunde des Britischen Nordamerika. Von Prof. Dr. A. Oppel. 154 pp., 13 Illustrations, 1 Map, and Index. G. J. Göschen'sche Verlagshandlung, Leipzig, 1906. (Price, 80 pf.)

Like the other works in the Göschen collection dealing with geography, this book is a model in its concise and well-ordered arrangement of geographical facts. It bases geography upon geology, and presents the subject to the general reader in a way that does not sacrifice the scientific value of the treatment. After a general discussion of British North America in its geographical conditions, exploration, government, settlement and industrial development, the country is considered in detail, for which purpose it is divided into the six regions of the Atlantic, the St. Lawrence, the Great Lakes, the Prairies, the Cordilleras, and the Arctic. The physical map shows elevations and sea depths in six tints.

Orangia.—A Geographical Reader of the Orange River Colony. By W. S. Johnson. vi and 66 pp., half-tone Illustrations, Diagrams, and Map. Longmans, Green, & Co., London, 1906. (Price, 1s. 6d.)

This reader was prepared for school children in the Orange River Colony. Soils and rocks, vegetation, mountains, rivers, and climate are described and the causes which produced them are treated. The approved methods of so doing are employed. Here is an example: In Europe most towns are placed along the banks of rivers, but the first settlers in the Orange River Colony found that

the river-sides were often the haunts of wild animals and also less healthful than the higher grounds, so that most of the towns are not close to the rivers, but always near a good spring, or in a place where water may be obtained without too much trouble. The early settlers found an excellent spring on the site of Bloemfontein to which they gave the name of a farmer, Jan Bloem; hence the name of the capital.

We learn that the population of the whole colony has nearly doubled since 1890 and that Bloemfontein has grown sevenfold in fourteen years. This little book is well adapted to stimulate an interest in home geography in colonial schools.

Dodge's Geography of Missouri. By J. M. Greenwood and C. F. Marbut. xii and 32 pp., numerous Maps, Illustrations, Diagrams, and Index. Rand, McNally & Company, Chicago, 1906.

A special text book for students in Missouri schools. Part I treats the surface features, climate, history, resources, occupations of the people, transportation, government, and education. Part 2 is given to the growth and development of the cities. The volume concludes with significant statistics. Photographs of characteristic features of Missouri are scattered through the book and an excellent small coloured map shows the distribution of mantle and bed rocks, soils, the production and value of various crops per square mile, the distribution of farm animals, etc.

The photograph of a relief model of the State, three inches square, is of little value and the larger map on a scale of 41 miles to an inch is poor. It conveys no clear idea of surface features, though it crudely attempts to do so. If it be asserted that the small coloured physical map on the following page meets all requirements, it may be replied that one of the needs of our geographical class rooms is maps that will give a true and good conception both of natural features and of the cultural aspects associated with them. The index increases, no doubt, the value of the book for reference purposes after school days are over.

Bermuda in Periodical Literature, with Occasional References to Other Works. A Bibliography by George Watson Cole. Printed for the Author, 1907.

This handsome book, beautifully printed by the Riverdale Press, C. A. W. Spencer, Brookline, Mass., is a reprint with considerable additions, of two series which have appeared in the Boston Book Company's quarterly periodical, *Bulletin of Bibliography*. Mr. Cole says in his preface (dated at Riverside, Conn.) that he has made a special effort to record, as completely as possible, the labours of the scientific writers—zoölogists, botanists and geologists—who have devoted themselves during the past fifty years to the study of Bermuda.

The number of titles in the book is 1,382, and the entries in the Index have been so arranged that the subject can be traced continuously back to the earliest article upon that topic.

Mexico and Her People of To-day. By Nevin O. Winter. vii and 405 pp., 2 maps, 48 illustrations. L. C. Page & Co., Boston, 1907.

The author says: "Vast mountains, including Popocatepetl and Ixtaccihuatl, the loftiest peaks on the American continent, are seen here amid scenes of tropical beauty and luxuriance." It is well known that several peaks in Alaska exceed

the Mexican volcanoes by more than 2,000 feet in altitude and South America has still higher summits. Mr. Winter accuses Prescott of a merely fragmentary knowledge of older literature on Mexico, but it would be well for him if he had only a part of it or, at least, part of the honest critical spirit which Prescott displayed for his time. On the other hand, we find, at the close of the first chapter, the excellent remark: "Things cannot be changed to Anglo-Saxon standards in a year, or two years, or even a generation. To Americanize Mexico will be a difficult, if not an impossible undertaking, and there are no signs of such a transition. Americans who live there fall into Mexican ways and moral standards more frequently than Mexicans are converted to the American point of view. The influence of traditions, customs and climate, and the centuries-old habit of letting the morrow take care of itself is too great to be overcome." It is very gratifying to meet with such an absolutely true, fair and practical appreciation, which is very rarely if ever found in other writings upon Mexico, and it shows that the author is an honest and sincere writer.

In perusing this charming book one is tempted to become very partial and pass over in silence its errors and misstatements. Although these errors are numerous it is the best popular book so far written on contemporaneous Mexico. Being devoted to "Mexico and her people of to-day," it must be mentioned, in order not to appear too partial, that the information given about primitive Mexico, the Spanish colonial times and some anthropological features of the Indians would have been acceptable half a century ago.

It is, for instance, a matter of the past to believe in the affinities between the Indian languages of Mexico and those of Japan and China. The features of the Indian occasionally resemble Asiatic types and, not long ago, the Indian in general was regarded, from a physical standpoint, as a so-called Mongol; but it is "out of date" to generalize and emphasize such points of accidental resemblance.

An error of a geographical nature which Mr. Winter commits in various places is to be noted. He limits the *tierra templada* of Mexico to a zone between 3,000 and 6,000 feet above sea-level. The upper limit of that belt is much higher. The City of Mexico, which lies nearly 7,500 feet above the ocean, still belongs to the temperate belt, and toward the south this naturally rises.

Each chapter may be picked out at will and read without connection with the others, as each forms, so to speak, an independent unit. And yet there is logical sequence through the book. The descriptions of nature are often poetic, always attractive, and never bombastic. The style is agreeably concise, and the author often displays the happy and not common faculty of characterizing, in a pointed manner and a few words, what he relates or describes.

Illustrations are numerous and very good. They are not the hackneyed pictures which we are beginning to accustom ourselves to find in books on Mexican topics. The map of Mexico is of moderate accuracy and rather indifferent execution. A. F. B.

The France of To-day. By Barrett Wendell. 379 pp. New York, Charles Scribner's Sons, 1908.

At this time, when literature is largely composed of illustrations, it is almost refreshing to find a book without pictures, not even that of the author. But if in the present instance the volume is exclusively occupied by text, that text is so florid and often so entangled that we almost regret the absence of pictures which

might, had the subject permitted, have simplified the task of illustration in words. We must not forget, however, that the eight chapters into which the book is divided are so many separate lectures, and that what may be listened to with intense interest and even delight, is sometimes very dull reading, the personality of the lecturer not being present to convey the proper impression. The reverse also takes place. Thus the sermons of the celebrated Vinet are admirable when read, whereas to listen to them inspired the hearer with but one idea: that of speedy removal from the place where they were delivered.

The subject of these lectures might be called a modern Ethnography of France, and, as such, but indirectly related to geographical problems; but while the treatment is lengthy and tiresome in form to the reader, the substance is rich in thought, knowledge, and accurate observation. The author is fair, just, and mild in his appreciations, conciliatory in his views, and he has well grasped the influence of historic development upon ideas and events.

While we have to wish the reader considerable patience in studying the work, we do so with the conviction that the patience will be richly rewarded.

A. F. B.

Au vieux pays de France, Excursions de Vacances dans le bassin de la Loire, Touraine, Anjou, Berry, Sologne, Vendée et Bretagne. Par Louis Rousselet. 320 pp., 137 gravures. Librairie Hachette et Cie., Paris, 1906.

Upon a superficial glance through this book one might be tempted to recall the picture of a band of tourists running at full speed the gauntlet of European art-galleries. But first impressions are often misleading, and this would be the case in the present instance. Under the pretext (so to say) of rendering account of a swift bicyclistic journey through a part of central France, the author conveys a wealth of information on the topography, archæology and history of that region, of the highest interest and importance to the serious reader. What creates the impression of haste in description arises from the logical terseness and precision which enable a writer so thoroughly master of his native tongue as Mr. Rousselet to condense in a few paragraphs more than an ordinary pamphlet could express. Hence, the purely topographical part is in excess of the far more fascinating descriptions of architectural remains and historical events. Like the landscape through which the author and his companions pass, which, though devoid of mountain scenery, is agreeably broken by the constant view of towering castles, stately manors, ruined monasteries and lofty churches, so the inevitable monotony of description of the country and thoroughfares is charmingly varied at intervals by that of the venerable monuments of bygone days.

While the country thus encompassed is justly named by the author the "Valley of the Loire," it is subdivided into four regions: the valley from Blois to the coast near Nantes; the plateaux of the Sologne; the Berry and the valley of the Indre; the country from Tours to Vierzon in the valley of the Cher,—the valley of the Loire as far as Beauce; embracing, that is to say, Touraine, Anjou and even parts of the Vendée, or "Old" France.

The observations of Mr. Rousselet also extend to the commerce and industry of the country. There are no dreary statistics, but pictures of the agriculture and the horticulture are pleasingly varied with description of the few industries. The lake of Grand-Lieu, alternately changed from a fertile field into a basin abounding with fish, and back again, arrests attention, and the great slate quarries west

of Angers are well described. An industry now gradually waning is the quarrying and shaping of flint; and Mr. Rousselet tells of the distribution of timber throughout the region, its destruction in former times, and its re-planting after the great commotions of the Revolution.

It is stated that one twentieth part, or about a million and a half, of the present population of France, live in cave-dwellings. There are extensive groups of troglodytic habitations. While those in and around Bourré (Department of Loir et Cher) are probably the most important of these abodes, they are also found in actual occupation in other parts of France. Dwellings, stables, store-rooms, halls, chapels, offices, arranged and furnished in more or less modern style, have been carved out of the rock. To Bourré the author devotes particular attention. It is a large subterraneous settlement, in an enormous pile of white limestone, the inhabitants of which during the milder season cultivate their vineyards outside and, when the weather becomes severe, work in the huge quarries adjacent to their homes. Another subterranean industry is also carried on by these people, the raising of mushrooms in abandoned galleries of the vast quarries. Not all of these cave-dwellings are exclusively artificial. Nature had already prepared shelter for man long before his earliest appearance and in such primitive recesses human and animal remains and artifacts of the rudest type have been found, showing that the occupation of at least a part of the caverns of Bourré has been continuous, probably, throughout all the known stages of human development.

Thus the valley of the Loire (taking it always in its widest sense) offers to the tourist and student all specimens representing the abodes of man in France from the earliest times to the present day. There are Celtic and Roman vestiges, dungeons and castles of Merovingian, Carlovingian and later types. The architecture of the Plantagenet period is represented on every side, and after the castle, under the influence of the Renaissance, partook more and more of the character of a palace, there arose magnificent specimens of architecture like Chaumont, Chambord, Chenonceaux, and others. The history of these monuments, of the numberless attractive churches and of the quaint settlements around them, throws a flood of interesting lore over the country in which every epoch of the vicissitudes of France is richly represented. Mr. Rousselet introduces us to all this in a characteristically clear and concise manner and with thoroughly trustworthy historic knowledge.

The abundant illustrations from photographs are in strict keeping with the excellent character of the text. A. F. B.

The Ohio River. A Course of Empire. By Archer Butler Hulbert. xiv and 378 pp., Maps, Illustrations, and Index. G. P. Putnam's Sons, New York and London, 1906. (Price, $1.75.)

This handsome book, admirably produced by its publishers, with large type and many illustrations, shows the part that the Ohio River has played in history. It tells a fascinating story whose interest is, if anything, enhanced by the way of telling it. Perhaps the author did not especially aim at such a result, but his book, on the whole, is a study of the interrelations between a great geographical feature and man. The Ohio opened the marvellous conquest of the West, for it was, as the author says, the highway beyond the Appalachians that led thousands of pioneers to the West long before the Great Lakes became an emigration route.

The author divides the history of the river in its human relations into four ages: (1) the Canoe Age, when the pioneers paddled back and forth on the main

trunk of the Ohio and its important tributaries in their long, heavy canoes, carrying great packs of furs, and casks of salt and provisions. (2) the Flatboat Age, when the rush of Western emigration relegated the canoe to the smaller streams and keelboats and flatboats took its place. In those busy days, when the Middle West was being settled, sixty and seventy flatboats were sometimes seen to pass a given point in a single day. The (3) Steamboat Age marked the rise of the great industries and the swift advance of Pittsburg, Cincinnati, and Louisville. With the end of the nineteenth century, the river passed (4) to the Age of the Steel Barge, one tugboat hauling a fleet of freight-laden barges.

Owing to the numerous floods, the majority of the population in the valley was not found along the banks of the river until the steamboat age. The same is true of the Indian nations who made their homes far from the river and up its tributaries.

The author has used his copious materials with great care and his book is a welcome and adequate treatment of an important subject. The index is excellent. The map, unfortunately, does not show a single topographic feature excepting the drainage. It gives no indication of the very geographical features here described as shaping history! A chapter giving an expert geographical account of the Ohio Valley is lacking, though it would have been valuable.

Panama. The Isthmus and the Canal. By C. H. Forbes-Lindsay. 384 pp., 16 Views from Photographs, Maps and Diagram. The John C. Winston Co., Philadelphia, 1906.

The book may be commended to any reader who desires a straight-forward and simply written account of the Isthmus of Panama and of the canal. The story is told from the earliest explorations to the present time. It does not contain technical matter. The author is very successful in his efforts to extract from long official reports all that the general public cares or needs to know, and in giving the gist of everything in his own language and in an interesting manner. His description of the 85-foot level plan, upon which the canal will be constructed, is a readable and accurate treatment of a topic that might be made very dry. To put the story of the great engineering project into its proper setting he gives us first a clear idea of the isthmian country and describes the Panama Railroad, Canal exploration and the French fiasco. The small black and white maps are poor, but a good plan of the canal on the 85-foot level is given. The book lacks an index.

Ein Land der Zukunft. Ein Beitrag zur näheren Kenntnis Argentiniens. Von einem deutschen Offizier. 274 pp., 100 Illustrations, and 1 Map. Verlag von "Südamerika" (J. Greger), Munich [1903 ?]. (Price, M. 5.)

The author says that letters sent to him from Germany were addressed to "Buenos Aires, Brazil," and that after his return to Germany, educated persons asked him whether Spanish or Portuguese was spoken in Buenos Aires. He has written this book to give his countrymen correct ideas of the history, development, present condition and future prospects of the Argentine Republic. The volume contains a great deal of information relating to all parts of the country. The engravings from photographs are especially notable, as most of them are original and their tendency is educational.